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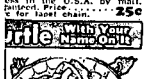

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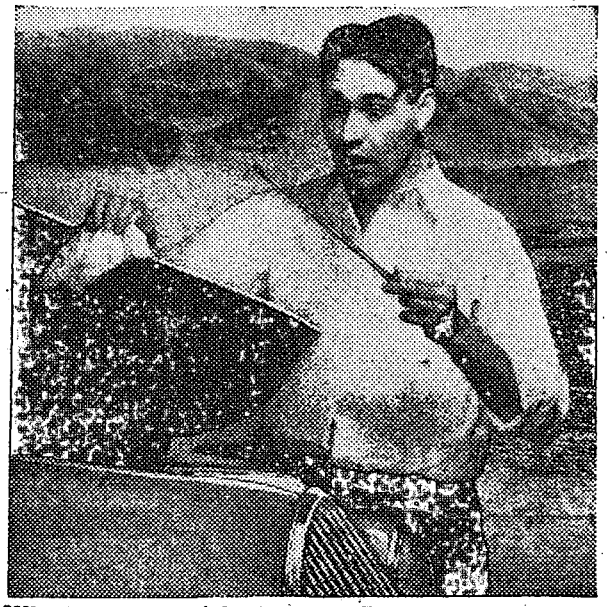

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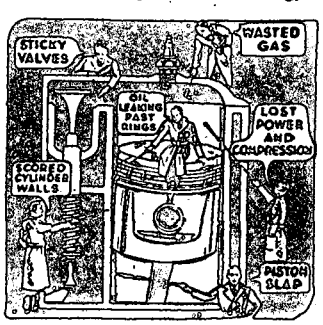

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THRILLING WONDER STORIES

The Magazine of Prophetic Fiction

VOL. XII NO. 1

August, 1938

IN THE NEXT ISSUE

THE BRAIN PIRATES
A Penton and Blake Novelet
By
JOHN W. CAMPBELL, JR.

SATELLITE FIVE
An Interplanetary Novelet
By
ARTHUR K. BARNES

THE CHALLENGE OF ATLANTIS
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THE MAN WHO SAW TOO MUCH
A "Tubby" Story
By
RAY CUMMINGS

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ON THE COVER

This cover painting depicts a scene from THE EXTERMINATORS, a novelet by Frederic Arnold Kummer, Jr., in this issue.

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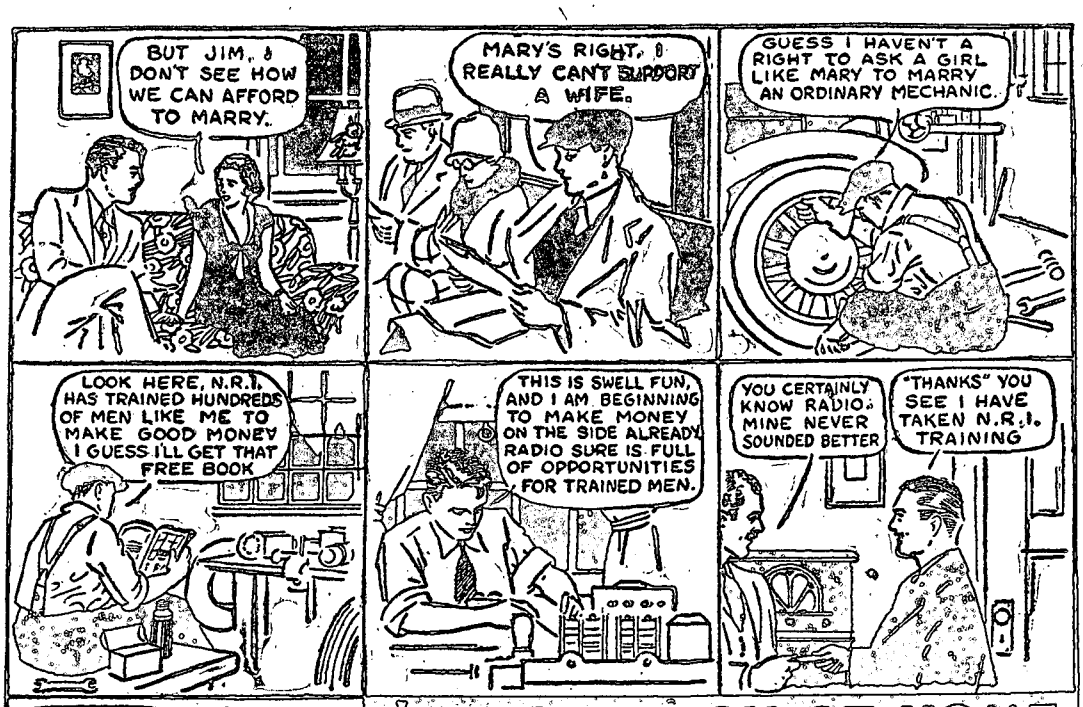
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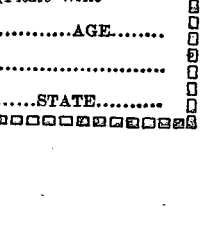

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IN this department we shall publish your opinions every month. After all, this is YOUR magazine, and it is edited for YOU. If a story in THRILLING WONDER STORIES fails to click with you, it is up to you to let us know about it. We welcome your letters whether they are complimentary or critical—or contain good old-fashioned brickbats! Write regularly! As many of your letters as possible will be printed below. We cannot undertake to enter into private correspondence.

CARLYLE VS. QUADE

By T. Bruce Yerke

The little feud between Barnes and Kuttner in "The Dual World" has presented a new idea in science fiction. In fact, the previous lack of the technique they have adopted explains why it is so hard to "get into" a scientific story, particularly those of the interplanetary variety. In science fiction tales of the past few years, there are only a handful in which you gain a "familiarity" with the set-up of the story. In every new story about a different age or pattern, the reader has to get accustomed to an entirely different set of cities, colonies, customs, etc. In other words, it is pretty difficult to plunge into every new science fiction story and be convinced as to the aspects of a new universe.

Now, in the feud between the characters of Kuttner and Barnes, both authors base their action in the same age. As I was reading "The Dual World," I was just getting through it. Then came the part where Nine Planets Films, Inc., was knocked. Immediately I associated the story of Tommy Strike and Gerry Carlyle with past events in another story. The mere mention of Hollywood on the Moon gave me a strong sense of familiarity. I immediately tied up "The Dual World" with events that had happened in the story, "Hollywood on the Moon"—which was a swell means of stimulating my interest. I was "in" the tale before I knew it.

In short, that is what has been lacking all along, for the past twelve years, in science fiction. That missing link in every story. If only each story could be associated with another story, it would result in narratives being more interesting and more convincing. If only some editor would write an authentic history of the Solar System from 2000 A.D. to 3000 A.D., for the use of science fiction authors, he would be a savior. If Barnes and Kuttner can get together and map out the future for even their two series, and have both of their series based around the same basic events, they will be pioneers in the science fiction field. (A swell idea! —Ed.)

That's why it's so easy to get into an aviation story in THE LONE EAGLE or SKY FIGHTERS. Every story is based on a definite pattern, known events of the World War, with references to the same military coups, towns, battles, planes, etc. I hope you get my point.

Now I'll get down to the job of rating the stories in the June issue. The best story of the issue was "The Dual World," by Barnes, for the very reasons I mentioned before, and, incidentally, I'll wager that half the reason why Kuttner's story in the last issue was so successful was because it was based on Hollywood's glamour, which everyone automatically associated with the story.

The next best story was "Murder in the Void," by Edmond Hamilton. "The Great Illusion" sounds quite a bit like the Fortean Society, which claims that the stars may not be so distant after all. That story was a tie for third place with "The Man Who Looked Like Steinmetz." Next would be "The Reinmuth Rider," followed by "Wings Across the Cosmos." "The Year of Unreason" was quite mediocre. "Time on My Hands" was feeble. I really enjoyed your new feature, SCIENCE QUIZ, and the cover was very good. On the whole, the issue shows quite a bit of improvement.—1256 N. Kingsley Drive, Hollywood, Calif.

EASY READING

By Alex Fontaine

Thank heaven for the June issue of T.W.S. Why? Because the stories were easy to understand. I'm just an ordinary high-school freshman, and stories like "A Month A Minute," involving intricate mathematical formulae, floor me. Pages of scientific discussion may be interesting to some, but they are just Greek to me.

Then came the June issue, to save me from a horrible fate. "Terror in Utopia" was very good. "The Man that Looked Like Steinmetz" was okay. "Murder in the Void" was a honey. Why didn't you tell us that Rab Crane, our pal of "Space Mirror," was going to be back in it?

About the reprint question: I am in favor of it. You could make it into a department,

(Continued on page 121)

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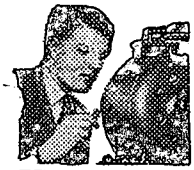

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I want home workshop tools, lathes, saws, etc. I have mandelette camera, etc. Smith Kelly, Looneyville, West Virginia.

Railroad Centenary set, Austria 1937, with first day and one day commemorative postmark on special sheet bearing artist's own signature, to swap for what? Only hundred numbered sheets exist. Rudolf Trimmel, Wien X, Laxenburgerstr. 26, Austria.

Who will exchange stamps with an Irishman who has a large general collection and five thousand duplicates? Mervyn L. Colhoun, 18 Grove Place, Londonderry, Ireland.

Have portable typewriter, one year old, in excellent condition. Want photo enlarger, camera, or what have you? Alan Gold, 1170 East 8th Street, Brooklyn, New York.

Mail order plans, stamps, correspondence art courses to swap for what you have. Send list first. Mr. Salak, 527 East 71st, Chicago, Illinois.

I am offering my telescope, astronomy course, many radio and electrical parts, etc., for your musical instrument or what have you? Robert F. Meade, 819 Wyandotte, Kansas City, Mo.

I want Indian head pennies and some Lincoln. Send dates of what you have. What do you want? Mrs. Iva E. Henderson, Newton, Iowa, Route No. 3.

Have fifty dollar scholarship in I.C.S.; collection of unused Creek Chub plugs (7). Swap for? George Jackson, % Leo Hitch, R. R. 1, Sellersburg, Indiana.

I have a four tube radio with a magnetic speaker which I would like to trade for United States School of Music Piano Course. No others accepted. Herbert Perry, 162 Bromleigh Road, Stewart Manor, Long Island.

American, French and Canadian old money for well equipped house car to sleep in for six people. State offers. Iva V. Baker, 500 Mechanic Street, Three Rivers, Michigan.

A chemistry set, radio supplies, stamps, post marks and a few coins are offered for your things. I also have a few odds and ends, and souvenirs from various cities. Austin Taber, 5229 Wells Avenue, St. Louis, Missouri.

Either a gasoline powered model airplane that flies or a gasoline powered model motorboat is wanted for a four tube Brunswick radio. Howard Jacobsen, Clyde Park, Montana.

I want stamps of any kind. I have earphones, postcards, postmarks, autographs, coins, ice skates; foreign and United States stamps, medals, etc. All mail answered promptly. S. Freeman, 921 Home Street, New York City, New York.

Swap good pair of French binoculars with case for postage stamp collection. Victor Yuskus, 481 East 26th Street, New York City, New York.

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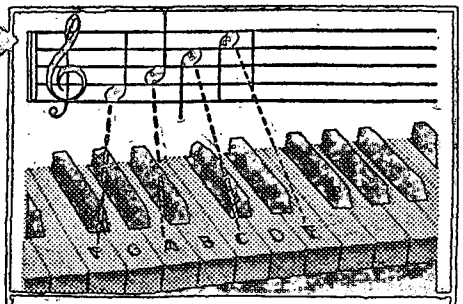

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Deep Within the Sub-Lunar Caverns of Hollywood on the Moon, the Most Glamorous City in the Solar System, a Horde of Radio-Controlled Robots Menace the Movie-Makers of an Ultra-Modern Era!

CHAPTER I

INTERIOR: The offices of Nine Planets Films, Inc., Hollywood on the Moon. Close shot—Day.

"YOU can't film *Doom World*," Tony Quade said emphatically. "It just isn't possible. I've read the shooting script, and all I've got to say is that you made a big mistake in buying the movie rights, even if you are the president of Nine Planets Films, Inc."

Von Zorn's small, simian face was puckered with anxiety. He scratched his toothbrush mustache and murmured, "It was a best-seller, Tony. We paid the author plenty, but if we can screen the book we'll clean up. Otherwise we'll drop a lot—too much."

Tony Quade settled his large, big-boned body more comfortably in the glass-and-leather chair and shrugged.

"My tears will mingle with yours, Chief."

"But you *can* film *Doom World!* You got those Jupiter explosion shots last year, and the comet sequences for *Space Devils.* There isn't a special effect in the System you can't handle."

"Exploration on Pluto, though," Quade said, frowning. "Do you know how many expeditions have died there? You can't live on a radioactive planet."

"The characters in *Doom World* did."

"Can I help it if the author's vacuum-minded?" Quade's voice grew ironic. "Some dizzy scientist exposed 'em to

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negative radio-magnetic rays, whatever they are, and neutralized the effect of the Pluto radiations. That may sound good on paper, and it help make the book a best-seller, but you know darn well it's sheer fantasy. Pseudo-science—rats! It's a fairy tale."

"So you refuse the assignment, eh?" Von Zorn said suavely, his snappy black eyes glinting. "I'd certainly hate to blacklist you in the System."

Quade smiled thinly.

"You couldn't blacklist me for turning down an assignment like *Doom World*, and you know it. How could we possibly film the picture on Pluto?"

"You wouldn't have to," Von Zorn said. "That's why we own some of the sub-lunar caverns. All you have to do is build a set in one of 'em duplicating the Pluto scene. There's no danger from radioactivity, for there won't be any."

"And what about the livestock? The book's full of Plutonian animals, and they can't live without radioactivity. Do you want me to film *Doom World* without the beasts?"

"Robots," Von Zorn urged. "We've used artificial monsters before. You can handle 'em by radio control."

"It must be nice to sit at a desk all day and not know anything about picture making," Quade said impolitely. "Do you realize how complex the neural and muscular structure of Plutonian animals is? An ordinary radio control unit couldn't handle 'em. They'd look like animated papier-mâché."

THAT, unfortunately, was quite true, even when less complex animals were used. However, the artificial monsters, radio controlled, could easily be created by the biological laboratories, and were much less dangerous to handle than the authentic life-forms. Moreover, the expense involved in locating, transporting, and keeping alive such creatures as a Venusian "whip" or one of the double-headed, apelike Hyclops of Ganymede would have been prohibitive.

The public often shunned the films of Nine Planets because the life-forms used were so obviously artificial. Von Zorn was unfortunately reminded of this by Quade's words. His face turned slightly green.

"And another thing," he snapped. "I just got word that Gerry Carlyle's coming back from Venus with a shipload of monsters in that blasted *Ark* of hers."

Quade grinned.

"The catch-'em-alive dame?"

"Yeah. Right after we finished shooting *Venus Adventure*. Know what'll happen now?"

"Sure," Quade said, but Von Zorn kept on bitterly.

"The picture won't draw flies! Because we used laboratory monsters, and now Gerry Carlyle's brought back the real thing."

"Why don't you buy her cargo?" Quade asked.

A low, grating sound was heard as Von Zorn gritted his teeth. Eventually he found words.

"Do you think I haven't tried? I offered her a fortune to forget her contract with the London Interplanetary Zoo and sell me the animals. Told her I could use 'em in films. Here's her answer." He thrust a crumpled sheet of blue paper at Quade, who smoothed it out and read it aloud with interest.

Dear Von Zorn:

Nuts.

Gerry Carlyle.

With an effort Quade kept his face sober as he handed back the message to Von Zorn.

"You don't deserve this, Chief," he said solicitously. "So that's why you want *Doom World* filmed, eh? The most popular book in ten years, with the strangest life-forms in the System. Thought it'd draw better than Gerry's animals?"

"Exactly! We can't lose on this. You've got to take it on, Tony."

"It's too big a job," Quade said seriously. "And it's plenty dangerous. I hear some of your biggest stars have been offered the lead roles, and said no."

Von Zorn grunted.

"Neal Baker's got the romantic lead. The heroine—is Kathleen Gregg."

Quade whistled under his breath.

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"A star role for her, eh?"

"Thought you'd be interested. I had a sneaking hunch you'd like to see Kathleen get ahead, so I gave her the part."

"I catch on," Quade said. "If I turn down the job, what happens to Kathleen?"

VON ZORN tried to register regret, but succeeded only in looking like a monkey with the colic.

"Why, I'm afraid we'll have to let her go. It's the only part I've got for her just now, and if you won't take on the picture, Kathleen's—out!"

Quade knew what that would mean to Kathleen Gregg. She had come to Hollywood on the Moon as a stowaway, and had been fascinated by the

lunar metropolis ever since. Just lately Von Zorn had given her a contract.

"I hope a meteor hits you," Quade told his employer. "You'd blow the Earth to bits to get a hit picture. Okay, you win. I'll film *Doom World* for you if it kills me—and it probably will."

Von Zorn smirked. "Nothing pleases me as much as a spirit of willing cooperation," he said smoothly, lighting a cigar made from greenish, aromatic lunar tobacco. "You will be well paid, Tony."

"You're darned right I will," Quade observed from the door. "Wait'll you get my expense account. I'll put in everything from drinks to an engagement ring for Kathleen."

"Always the joker," Von Zorn chuckled. His grin widened as Quade, with a snort of disgust, slammed the door behind him.

The President of Nine Planets Films, Inc., pressed a button and spoke into a dictograph on his desk. Presently he said, "Thurman? *Doom World's* going into immediate production. Tony Quade's in charge. See that he gets full cooperation. He'll need it!"

CHAPTER II

INTERIOR: The Silver Spacesuit — Quade and Kathleen seated at a table. Night, a month later.

WHEN you first saw Kathleen Gregg you immediately noticed her chin, then her eyes. She had a pointed little chin and snapping brown eyes, not yet tattooed to the popular tint of violet. Despite the fact that the Silver Spacesuit was the swankiest nightclub-restaurant in Hollywood on the Moon, Kathleen was wearing stained jodhpurs and eating scrambled eggs.

"There's egg on your nose," Quade pointed out helpfully.

"Go chase a meteor," Kathleen said, and made a hasty dab with her napkin. Chuckling, Quade turned to the window beside him.

The great lunar metropolis stretched for miles beneath their vantage point. It was a city of domes and towers and gardens, blazing with vari-colored brilliance beneath stars which were pale by comparison. Far to the north could be seen the Cyclopean rampart of the Great Rim, the walls of the crater that held Hollywood on the Moon. Aircraft drove past incessantly, and a low murmur of traffic trickled up from the streets far below.

"It's a great little city," Kathleen said softly. "We'll be beneath it tomorrow, Tony."

"Yeah. The set's built, and we're ready to start shooting. I've had a biologist helping me who's a wizard—Kenilworth. He's created Plutonian life-forms that'll make your hair stand up. Somehow he's managed to overcome stiffness."

"How do you mean?"

"Well, the radio control unit naturally can't handle all the muscular and neural organization, and as a rule a robot animal's body doesn't work in coordination with itself. Too stiff, you know. But Kenilworth's got something entirely new. Trouble is, he wouldn't let me in on it. Said he'd be ready to show me the whole thing to-

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morrow. Some new invention—but Von Zorn ought to pay plenty for it."

Kathleen touched the dial of the radio at their side, and a throaty voice began to croon:

Where the Martian moons ride over,
Where the flame-flowers blossom and burn,
Till the Sun grows cold, and the planets grow old,
I'll be waiting for you to return;
You brought me—

Quade gave a low, muffled howl and turned it off. Kathleen's chin lifted.

"What's that for?"

"You—uh, you like it?"

"That was a Neal Baker recording!"

"It still smells."

"Just because you don't like it—"

"My dear friends," said a pleasant, well-modulated voice, with a faint trace of some indefinable accent. "I've found you at last!"

"You lucky fellow," Quade said. "Hello, Neal. Kathleen, I'm afraid you know Neal Baker already."

She flashed him a deadly glance and moved over, offering Baker her seat and squeezing Quade uncomfortably against the window.

"Thanks," Baker said, sitting down. He looked exactly like what he was—the handsomest and most popular crooner in pictures. He was always being featured in romantic adventure films, and possessed a daredevil, swashbuckling air that was infinitely impressive.

"Tomorrow—the great adventure," he said, looking into Kathleen's eyes. "I'll be very glad to work with you—may I call you Kathleen?"

"By all means," Quade broke in genially. "She also answers to the name of Fathead, a sort of affectionate nickname, you know. I hate to mention it, Miss Gregg, but if you push me again I'll fall out the window."

"I hope you do," Kathleen said meaningly.

BAKER laughed politely, and Quade turned to face him.

"Neal," Quade began, "I've been wanting to talk to you about this job. It isn't an ordinary location flicker. I don't know if you realize just how different it is."

Baker raised an eyebrow.

"You've simply duplicated Plutonian conditions in a cave set. Eh?"

"Even fake Plutonian settings are bad stuff. And we're not using regular robots. You'll see what I mean tomorrow. Here's the point: there's danger in this job. Von Zorn put me in charge, and you'll obey my orders. No publicity stunts. If you try anything like going off on a hunting trip, like you did last year on Phobos, there's going to be trouble. These robots are *muy malo.*"

Baker smiled.

"I see. If there's any publicity, you want it."

Quade didn't answer, but his lips tightened. Kathleen said, "Oh, don't try to show your authority, Tony. Just because you don't like Neal—"

"I see," Quade grunted. "Might have expected this. They all do it, the minute they get a contract."

Kathleen's gaze was not pleasant. She said softly, "What?"

"Go Hollywood," Quade told her, and got up to leave. The others made no move to restrain him. Going down in the elevator, he shoved his hands in his pockets and frowned into space. There was trouble ahead. He could sense it. Years of knocking about the System, grinding cameras from Mercury to the giant planets, had given Quade plenty of experience. He knew, somehow, that before *Doom World* was canned there would be complications.

Quade swore under his breath as he stepped out into the roaring, white-lit expanse of Lunar Boulevard. Far beneath him was the cavern where the Plutonian set had been erected. And, though he did not know it, his hunch was right. Kenilworth's biological experiment was in the process of going haywire.

THE road cut through the jungle like the slash of a ray-gun's beam. Over its surface raced the autocar, and on every side towered the fantastic scenery that duplicated the terrain of the System's only radioactive planet. It was a glittering mirage of blinding

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color, gigantic vegetation, leafless, but covered with a glowing, many-hued coating of metallic scales.

Four men and a girl were in the car. Quade, Kathleen, Baker, and two others. One was thin-faced, a stooped oldster who peered near-sightedly through the hollow shells of optical glass that overlapped his eyeballs. That was Kenilworth, the biologist.

The face of the other man had, eight years before, been familiar to every youngster in the System. At that time Interplanetaries had held the place that, in the Twentieth century, Westerns had occupied. At every matinee the giant figure of Blaze Argyle had fought his way through hordes of inhuman beings, with gun, blade and fist. His jutting jaw and famous grin had provoked a storm of applause from youthful audiences at every appearance.

He was working in a hash joint when Quade found him. His hair was iron gray, and there were wrinkles in the tanned, strong face. That was the way in Hollywood on the Moon. A vogue passes quickly. There were many one-time stars who had been supplanted by younger men as the years rolled by.

But Quade had remembered the man who had once been his hero, his boyhood ideal of courage and strength. So, despite Von Zorn's objections, he had signed on Blaze Argyle in a supporting role in *Doom World*.

Somehow the wrinkles were fewer now on Argyle's scarred, weathered face. The old war-horse smelled again the smoke of battle. His role was that of a veteran pilot of a tramp space ship, and it was tailored to fit him. Neal Baker, who preferred to have the only heroic part himself, was not pleased.

Subdued crashings in the gleaming forest spoke of life. Quade turned to Kenilworth.

"I still don't see how you've done it," he said. "You say the radioactivity isn't dangerous?"

"Uh? No, no, of course not. Haven't you learned elemental physics? I didn't use a radium basis; I used an isotope of radium, one of the newly-discovered ones. Same charge, but different masses." Kenilworth's thing face wore a scowl. "I'm paid to work at biology, not to give lectures to jackasses."

Blaze Argyle chuckled deep in his throat. Abruptly his huge hand shot forward, closed over the control lever. The car jerked to a halt.

Immediately the reason for his action became clear. Something was charging along the road toward them, a creature that might have emerged from a nightmare.

"Plutonian devil," Kenilworth said, snatching up a small, portable instrument board from the floor. "Watch, now."

The thing had the grotesque, plated head of a sea-horse towering from a thick, serpentine body that flowed along effortlessly on a dozen stumpy legs. Its muzzle was tubular, surmounted by a single unwinking eye. It was about ten feet long, and thick as a man's torso.

ARGYLE'S hand flashed to his belt, but the gun he carried was loaded with blanks; he realized this and cursed softly. Kenilworth's fingers were dancing over the instrument board. The Plutonian devil stopped.

It stood quiescent a moment, and then slowly moved aside. The car slid forward, raced on.

"You want to watch out for the thing's spray," Kenilworth said. "It spouts a toxin that has rather peculiar effects."

"If you think I'm going to work with those things, you're crazy," Neal Baker said, his face very white.

"There's no danger," Kenilworth told him. "They're handled with the usual robot control."

"Never used robots in my day," Argyle observed. "When we went on location, we took guns and plenty of ammunition. I remember one time we ran into a whip on Venus—"

Baker interrupted sharply.

"Quade, it's up to you to take every precaution. Understand?"

"There's no danger, I tell you," Kenilworth snapped irritably. "The power generator's in my laboratory, and you'll have plenty of portable control units to handle the robots."

"Just how does that work?" Quade

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asked. "Haven't you built up a wider range than usual?"

"Yes, from forty meters down to seventy millionths of a centimeter. The robots are handled by remote control, of course, but I've got a key wave which is continually hitting the receiving apparatus in each robot. I've used that to make the receivers automatically compensating, so they'll adjust themselves to get any wave length I send out within the limits of my transmitter. For some reason there's a lot of interference down here and I don't want any trouble."

"What I can't understand," Kathleen said, "is how you've made the robots—*alive*. They—"

"They are alive. Those Plutonian creatures are so complex that if you used a straight robot system they'd look like walking dummies. I duplicated the physiology of the things all right, and created artificial brains, as any competent biologist can do today. Remember those specimens of Plutonian life we trapped?"

Quade nodded. A dozen space ships had hovered above the range of Pluto's deadly radiations, and had let down on cables gigantic traps, in which a number of curious life-forms had been captured.

"Well, I grafted the cerebrum—the part of the brain that handles the motor nerves—on to my artificial brains, as well as certain other important parts. The instinct-control, for instance, was necessary. I couldn't transplant the entire brains, because they'd die without radioactivity. But the creatures are impregnated with a radium isotope that has proved quite satisfactory." Kenilworth grinned and bobbed, while everybody except Quade looked slightly dazed. Blaze Argyle said, "I see," and scratched his head.

THEY came in sight of a hut. An electrified fence guarded it from marauding beasts. All around it stretched the glittering rainbow blaze of the forest. As the car halted Quade had an inexplicable feeling of danger and menace that lurked between the shining columns of the trees. Light beat down strongly from the gigantic arcs far above in the cavern roof. He had a momentary sense of actually being on a far, alien world, instead of in an artificial set only a mile beneath ultra-modern Hollywood on the Moon.

"I'm going back to the laboratory," the voice of Kenilworth said creakingly. "You'll find another car in the shed over there."

Quade nodded. The rest of the cast—a very small one—and the crew would be along soon, piloted by Kenilworth's assistant. They could begin shooting within an hour. Probably the picture would be safely in cans within a week, for the sequences which did not deal with Pluto had already been filmed. The meager figure of the biologist dwindled; the car faded to a speck and vanished. From the shining forest some creature bellowed angrily.

Again Quade felt that queer sense of foreboding. But he could not know what was happening all about him, the slow growth of living tissue that was to have a cataclysmic effect on the wireless receivers buried deep within the brains of the Plutonian robots.

CHAPTER III

INTERIOR: Kenilworth's laboratory. One week later. Close shot.

KATHLEEN and Neal Baker strolled between tables of working equipment—microscopes, electrical stimulators, intricately twisted apparatus, masses of flesh in their glass containers. A heavy odor of formaldehyde, ozone, and less pleasant things made the girl use her scent bottle often. Behind the two Blaze Argyle wandered disconsolately.

The old-timer was unhappy. Films had changed since his day. Too much faking. Ten years ago a man had to have backbone to star in Interplanetaries. But now, with double exposures, montage, telephoto lenses and robots, any ham could be a hero.

But Argyle wasn't feeling sorry for himself. He sympathized with Quade, who had been having a hard time of it. Especially the way Kathleen and Baker

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had been treating him.

Characteristically, Argyle ignored the innumerable petty annoyances to which he had been subjected by Baker. The crooner never let Argyle forget that the oldster was playing a minor role, and that he, Neal Baker, was co-star of *Doom World*. The one-time headliner, used to the easy camaraderie of a bygone day, was hurt, but never showed it.

The worst of it was, Argyle thought savagely, the crooner was infecting Kathleen. The girl had gone Hollywood with a vengeance. A big star might get away with it, but not a youngster in her first flicker. When Kathleen had acquired a languid slouch, Quade had chewed his pipe in bitter silence. He swore under his breath for ten minutes the day she high-hatted a cameraman. Finally, when she made use of a studied drawl and became temperamental during a crucial shot, Quade e[illegible] and made the air sizzle with pointed remarks. For a day Kathleen was subdued, but Neal Baker's fascination soon reestablished its sway.

There was only a day's shooting left, but this comprised only backgrounds which Quade handled himself, with one assistant. The others had gone back to Kenilworth's laboratory.

Not one of the three saw the door slowly open, nor did they know that slowly approaching them was a healthy, full-grown specimen of *Plutonis flagellum*—a "gliding lash." The thing was slate-gray in color, with no trace of sensory organs. Its conical, squidlike body was supported by a dozen very slender tentacles, serpentine and covered with saw-toothed, ridged scales. Between these appendages dangled a grayish, ragged membrane like a cape.

Kathleen saw it first, and instinctively she looked around for the robot's controlling operator. But neither Baker nor Argyle had a keyboard, and there was no one else in sight. The gliding lash tottered forward unsteadily on its slender, coiling legs.

"Somebody's playing a practical joke," Baker chuckled. "Probably our friend Quade's back. Pretend we don't see it."

Blaze Argyle was watching the creature which, half as tall as his body, was slowly coming closer. Now he could see a cluster of threadlike filaments waving above the conical "head" of the thing—sensory organs, ultra-sensitive to vibrations.

THE lash halted, crouched down, coiling its slender legs beneath it. Suddenly Argyle shouted, "Look out!" Simultaneously the creature sprang.

The uncoiling legs shot it up like a streamlined projectile until it hovered a dozen feet above the floor. Now the purpose of the filmy membrane became plain. The lash slowly dropped down like a parachute, guiding its flight by manipulating the tentacles. It drifted, slipped sideward, and swept straight for Kathleen.

She heard Argyle's shout and leaped back in time. The creature seemed to pause in midair, then settled neatly over Neal Baker's head. His frantic yelp was smothered suddenly.

The slender tentacles swept into terrible action. They flailed viciously at Baker's torso in a blinding whirlwind of motion. The thing was well named, and in a moment the saw-toothed scales of the lashes had ripped Baker's coat into ribbons. Beneath it he wore a thin but very tough membraneous shirt, and this saved his life. The lashes could not reach the great arteries of his throat, but they swished down again and again at the man's body.

Kathleen cried out, made a frantic clutch at a tentacle. A crimson line sprang out on her bare arm. She was sent staggering by Blaze Argyle, who gripped a jagged fragment of glass he had salvaged from the wreckage of a retort.

One hand before his face, fingers spread, he threw himself into the battle. Baker went down under the impact, but the deadly whips flailed with unimpaired vigor. Argyle ripped the point of his weapon into the monster's pulpy, conical body.

Pale, whitish blood spurted. Argyle slashed at the thing viciously; the tentacles swung toward him. The tip of one brought blood from his hand as it

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ripped past his eyes. He aimed a desperate sweep at the threadlike filaments that made up the creature's sensory organs, and managed to slice them off. Immediately the lashes dropped to hang limp and flaccid.

Hastily Argyle pulled Baker free. His face was covered with a musky, thick slime, but save for a few minor cuts and bruises he was uninjured.

Kathleen was on her knees beside him, wiping the grease from his features. Baker spat, made a wry face, and scrambled to his feet, putting a table between him and the dead lash.

The door burst open. Mackay, one of Kenilworth's assistants, came hurrying toward him, his youthful face white under bristling red hair. In his hand was a gun. Relief sprang into his eyes as he saw the writhing body of the mutilated monster.

"Dead, eh?" he said. "Anybody hurt?"

Kathleen shook her head.

"What the devil are you trying to do?" Neal Baker gasped. "That thing nearly killed me!"

Mackay's mouth was a thin white line. "Not our fault, Mr. Baker. The robots have gone crazy. They—I can't stop now! One of 'em's wrecking the power generator."

He hurried away. After a moment the others accompanied him.

KENILWORTH'S laboratory was a great gray fortress near one side of the cavern. The power unit was housed in a barnlike structure of stone, and a gaping hole in the wall told of some monster that had crashed through it. From within came shouts, warning cries, and the creaking voice of Kenilworth yelling orders. The four paused at the gap in the wall, staring.

The thing that was lumbering about the power room looked like a whale. A small whale, but quite big enough to cause havoc. Its huge body was plated with dully-glistening shields, like the armor of a rhino. Four columnar, stumpy legs carried it slowly forward. A dozen transparent bubbles shimmered on its back, and within these spheres slender things like eels, each half as long as a man, were coiling and writhing angrily.

Already the monster had turned the room into a mass of wreckage. A dozen men, armed, scurried about purposelessly. The gaunt figure of the biologist was dancing near the monster, gripping a large hypodermic syringe in one hand, occasionally leaping to one side to avoid the sweep of the reptile's tail.

"What's he trying to do?" Argyle asked. "He'll kill himself. What's wrong with the radio control?"

"It doesn't work," the red-haired assistant gulped. "Anyway, there's no power now. The Juggernaut's smashed the generator."

Argyle had faced Juggernauts before, during the filming of *Doom World*, but then the monsters had been under the power of the wireless units. He gripped Kenilworth's arm as the biologist raced by.

"You can't get close enough to use that hypo," he said. "A gun—"

"Can't risk it," Kenilworth snapped. "The thing would tear the place to pieces before it died."

"Hypodermic bullets?" Argyle suggested.

The biologist hesitated, nodded. He gave a harsh command, and in a moment Mackay had returned with a clumsy, long-barreled rifle. Argyle examined the weapon, lifted it.

"Aim for the eye," Kenilworth said softly. "The armor's too thick everywhere else."

The Juggernaut lifted its great head, staring, as Argyle shouted a warning to the men. A calloused finger squeezed the trigger. Suddenly one of the monster's eyes vanished. The reptile bellowed, slid down gently and lay motionless on the floor.

Before the armored tail had stopped its twitching Kenilworth was beside it, examining his wrecked machines. The others followed. Kathleen was staring at the strange, transparent bubbles on the Juggernaut's back, and the serpentine creatures that still coiled and writhed within them. With singular inappropriateness the red-headed Mackay, pale and shaken, began a lecture.

"L-like the Surinam toad," he informed Kathleen. "Develops its young

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in eggs on its back. Parasitic creatures, the embryos. They live on the parent's blood, and by the time they hatch the mother's a walking skeleton. She has to find four times as much food as usual to supply the eggs with nutriment. After the embryos hatch the parent Juggernaut usually dies—"

"YOU blasted fool!" Kenilworth snarled. "Get to work! Want me to serve tea while you chat? Look at that—it'll take nearly a day to repair the damage, and there'll be no power until that's done."

"Haven't you any emergency power?" Kathleen asked. An unpleasant realization had come to her.

"That's smashed, too. I'll—"

Argyle put into words what had been worrying the girl.

"What about Quade?"

Kenilworth's face was a twisted mask.

"Ha! He's probably dead by now, even though the electrified fence around his camp's charged by storage batteries. Those damned robots—they're working on their brains now. He can't handle them by the control units, for there's no power. Besides, something's wrong. Metabolism—tissue growth—I'm not sure, but I think the transplanted brains are getting too strong for the robot controls. For the last two weeks they've been growing, getting more and more in command of the neural systems of the creatures. Even after the generator's fixed, I'm not sure it'll work any more."

"But—can't we help—" Kathleen's eyes were wide.

"How? I tell you, there's no power! I've already sent a man to the surface, but it'll take him hours to get there. Quade's unarmed. If he can reach the laboratory in his car, he'll be reasonably safe. If he had an airship—but you can't bring a ship down here."

"I'm going after Tony," Argyle said determinedly. "He won't realize there's anything wrong until it's too late. I can reach him in an autocar."

The biologist nodded slowly.

"It's suicide, Argyle. But all right. You'll need weapons—and other things. Come along; I'll fix you up."

The two disappeared through the gaping hole in the wall. Kathleen and Baker were left to eye each other.

"I'm going, too, Neal," the girl said.

"Don't be a fool," Baker advised. "It's hopeless."

"Will you come?" She persisted.

Baker gulped, and noticed that several of the biologist's assistants were watching. Kathleen put her hand on his arm.

"Please, Neal!"

"Think of the publicity!" Mackay said ironically. "I'll go with you, Miss Gregg."

"Publicity has nothing to do with it," Baker said with dignity, suppressing the expression that had come into his face at mention of the word. "You're needed here. Of course, I'll go." He gulped again, and shot Kathleen a glance of utter loathing.

She was worshipping him with her eyes.

THE car flashed along the roadway, Blaze Argyle at the controls, two guns hanging ready at his thighs. His gray hair was bristling, and there was a happy grin on the scarred, weathered face. Perhaps he was thinking of other days, long past, when he had fought similar perils.

The poisonous splendor of the shining forest was all around them. Now the distant noises of life were louder, more menacing. Uncontrolled life, alien and—hungry.

Hope was beginning to grow within Kathleen when the catastrophe occurred. A serpentine body flowed into view from the jungle, and the equine head of a Plutonian devil towered above them. Argyle wrenched at the controls, sent the car whirling sideward in a desperate endeavor to pass the monster. But the backlash of the thing's tail crashed against the side of the vehicle. The three were hurtled out of the car, sent rolling over and over along the road, bruised but unhurt. Neal Baker arose and departed hastily into the forest.

Argyle helped the girl to her feet, eying the Plutonian devil sharply. The creature was investigating the car, prodding it with its tubular muzzle.

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Abruptly it drew back, sent a spray of glistening liquid at the unfamiliar object. Argyle snatched up a knapsack that had fallen near by, and, gripping Kathleen's arm, hurried after Baker.

"Car's no good now," he grunted. "Those damn toxins! Kenilworth told me he left out the poisons when he built the animated robots, but I guess they developed 'em themselves from their food. He told me nobody could analyze the toxic qualities, anyway—like snake venom."

Breathless, Kathleen could not answer. A short distance away they came upon Baker standing at the edge of a small clearing, eying a tree uncertainly.

"Better not climb it," Argyle told him, and the star jumped guiltily. "The devil can climb, too. If it comes after us we'll just have to shoot our way out. See if your gun's loaded."

A low rustling told them that the monster had finished with the car and was in pursuit of more palatable food. It's horselike head was poked into view, and the single eye gleamed dully as it saw the three.

Argyle sent a bullet at it which glanced off the armorlike scales and tore down a tree.

"One way to kill it," he said. "Kenilworth told me—keep dodging it, Kathleen. Once it charges, it has to complete the charge. Can't swerve. Look out for the tail, though."

There was no time for more. The stumpy legs sprang into action, and the ten-foot monster sprang forward.

Kathleen leaped aside, but Baker was apparently frozen with terror. Only Argyle's push saved him from the devil. The creature flowed past, drew to a halt at the edge of the clearing, and turned slowly, its eye questing.

Argyle sent another useless bullet at it.

"If it stays still for a while, watch its eye," he called. Kenilworth had told him the almost incredible habit that made the Plutonian devil so terrible, but Argyle had no time to tell the others what he knew. The monster charged again, and for a little time they were kept busy dodging, watching the deadly backlash of the creature's armored tail.

LUCKILY the creature was not invulnerable, though none of Argyle's dozen shots had pierced the scales, each of them nearly six inches in diameter. But there were charred spots on the armored hide, and presently the devil hesitated, paused, and glared at the three humans. A little shudder ran through its sinuous body, and it sank lower until all its length touched the ground.

"Watch it!" Argyle said. But he was not looking at the monster. His quick stare was covering all the clearing, looking for the disturbance of earth he knew was coming.

Yet he almost missed it. The devil charged again, and simultaneously, almost at Kathleen's side, the ground heaved and split, and out of it came a white, wormlike, horrible thing that spat venom from its tubular muzzle.

The girl sprang back, was sent spinning by the sweep of the Plutonian devil's tail. She hit a tree, folded up and lay there unmoving. Argyle got in front of her, sent bullet after bullet smashing into the white worm. It spouted poison at him, and the next minute disintegrated into a chaos of twitching, bleeding flesh.

The armor-plated creature, its charge spent, lay on the ground, spasmodically quivering. Curiously its belly seemed to be split open, and nothing was visible within.

Argyle caught up the girl and carried her staggering, to a safe distance. Baker came out from behind a tree, looking pale and sick.

"Is it—are they dead?" he asked.

Argyle collapsed on the ground beside the girl.

"My knapsack," he said hoarsely. "Get it—quick!"

Baker found the pack and brought it to Argyle, who hastily dug out a syringe and injected a greenish solution into Kathleen's arm. That done, he repeated the operation with himself and lay back, breathing harshly.

"What's the matter? Can I—"

"Keep guard," Argyle told Baker. "I'll be all right in a minute. That damn poison—it breaks down the blood vessels, destroys the blood's coagulability. Kenilworth gave me this—" He

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touched the syringe. "Formula based on calcium chloride. Builds up the blood cells with calcium—"

Apparently Kenilworth's treatment was effective, for within five minutes the three were examining the dead monsters. The white creature looked like an undeveloped specimen of a Plutonian devil. The devil itself was now nothing but a skin.

"Sheds its skin, like a snake," Argyle said. "When the hide's badly damaged, it simply splits down the belly and digs into the ground. Every scale acts like a little shovel. Then it can come up behind its victim and kill it with the poison. The nerves in the skin automatically make it charge, though it dies right afterward. The devil itself—that white thing—gradually grows into its former shape."

Argyle shouldered the knapsack.

"Feel okay now, Kathleen?"

The girl nodded. "We're not far from the camp, are we? Good. Let's get started."

They turned back toward the road.

CHAPTER IV

EXTERIOR: Quade's camp in the Plutonian set. Long shot. Noon.

THE creature sat on the ground and looked at them with interest. Quade and Peters, the gaunt, hollow-cheeked cameraman, returned the gaze.

"It's a frog," Peters said.

"Frogs don't sing," Quade objected.

"They come pretty near it."

"But—words!" Quade said. "Listen." He caroled untunefully, "Where the Martian moons ride over—" and completed the first verse.

No, it wasn't a frog. It looked like one, although it was covered with curly ringlets of silvery hair. Its forelimbs were curiously anthropoid, with tiny little hands at the end. Its face was a frog's, though its mouth was mobile for all its size. Under its throat a pouch swelled, and as Quade paused the creature clasped its hands, sat up on its hind legs, and started to sing.

Quade's voice came out of the thing's mouth. It sang like a phonograph record, exactly duplicating Quade's tones, even to the off-key quaver at the end of the third line. When it had finished, it deflated the pouch, bobbing a little, and sat watching. "It even bows," Peters said in amazement.

"It's a mutation," Quade said. "Maybe. Parrots can do it, but—I've a hunch this is a bit different. Looks like a conditioned reflex to me."

"That clears up everything."

"Well—look. Suppose this little jigger simply imitates the cries of animals. Maybe it eats—Plutonian snakes. It hears a Plutonian snake hissing, or whatever it is they do, and imitates the cry. The snake hears it, thinks he's listening to a rival, or maybe a girl friend, and comes in a hurry, right down Caruso's throat."

"Sounds plausible," Peters admitted. "Is his name Caruso, though?"

"Name it and you can have it," Quade said, chuckling. The froglike Caruso chuckled with him, but broke off to scratch among its curls with a limber hind leg.

"I think we'll take it back with us," Quade went on. "The film's finished." He patted a disc-shaped metal container on a nearby table. "Wonder what's wrong with the televisor, though? Those things don't usually get out of whack."

Peters didn't answer, but turned to gather together the equipment. In a few minutes they were ready, and the car, carrying the two men and Caruso, glided out on the road.

They stopped very soon because a large animal sat up in the middle of the road and glared at them. Quade and Peters started to laugh. The creature looked like a turtle, but its head was flat and snakelike. The appearance of ferocity was entirely spoiled by the fact that the thing's tongue stuck out for almost a foot.

"I can't help laughing at those Tanks," Quade grinned, reaching for a control keyboard. "I know they use their tongues as a sensory organ, but

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they look so darned silly!" Caruso joined in the laughter. The monster got up and aimed a blow at the car with one stumpy forefoot. Quade pressed a button.

NOTHING happened. Quade and Peters stopped laughing, but the inane chuckles of Caruso kept on. The creature's foot continued to descend.

Quade and Peters got out of the car just in time. They took a keyboard and the precious can of film with them, and Caruso hopped after them, still giggling. The gigantic foot came down on the car and crushed it into a twisted wreck of metal.

"Oh, Lord!" Quade muttered, fingering the keyboard desperately. "What's wrong? Is—" A startling thought struck him. "Maybe Kenilworth's generator's stopped! That means—"

"It means we've got a comet by the tail," Peters said, looking sick. The Tank turned to them, very slowly, and its tongue quivered, picking up the vibrations that told it where its prey were. The snaky head moved down with slow deliberation.

"No danger," Quade said. "We can dodge it." He stepped back; the head continued its sweep until it bumped against a tree trunk. For several seconds the creature remained unmoving, apparently amazed at the disappearance of its lunch. Then the head lifted again, and once more began to descend.

"Let's get back to camp," Quade said. "We'll be safe there. The power's sure to come on pretty soon."

They departed, while the monster remained still staring at the spot where they had been. Some minutes later it realized that it was looking at nothing but trees, and vainly began to explore the air with its delicate tongue. But Quade and Peters, accompanied by Caruso, were already far away.

Muffled roars and crashings came from the forest. As they passed by a boulder half embedded in the ground Caruso paused to investigate. There was a hole in the rock, and just above it dangled a round, pinkish object that sent forth an enticing odor. The curly frog hopped closer, interested.

He put a tentative paw up toward the pink thing. It was apparently a fruit of some kind. It smelled good; probably it would taste better. Caruso licked his lips with an expectant tongue.

Quade turned around just in time to see the hole in the rock close with a vicious snap, while Caruso bounded back yelping in horror. The stone suddenly arose on six legs and pounced forward, but the woolly frog was already disappearing in the distance.

Quade and Peters watched alertly until the thing settled back and resumed the appearance of a boulder. Again the fruitlike object dangled temptingly.

"That's not new," Peters said. "The angler fish does it on Earth. Funny how much similarity there is on all the planets."

"Very," Quade agreed drily. "I'll feel safer at camp. Let's hurry."

Tragedy struck before they reached safety. A whiplike, slim form flashed down from a tree, struck at Peters, and darted away. The gaunt cameraman was left staring at a tiny puncture in his forearm.

"Just a scratch," he began—and suddenly collapsed. Quade caught him as he fell. Hastily he improvised a tourniquet, carried Peters the few remaining steps to camp, and found a suction pump. But his first-aid methods were useless.

THE form of Peters, prone on a cot, began to twitch and jerk. The man's eyes opened wide, blind and unseeing. A spasm of muscular contortion jerked him to the ground, and Quade tried in vain to save him.

Peters' head jerked and rolled grotesquely. He seemed to have lost all control of his neck muscles. There was a sudden ghastly contortion, a brittle cracking sound—and the man went limp. He was dead.

Quade's lips were tight as he looked down at his friend. He was remembering an experience in Honduras, on Earth, with *Crotalus durissus*—a rattlesnake whose poison, apparently, was similar in its effect to that of the creature which had attacked Peters. The venom is a neurotoxin, which possesses

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a selective quality that affects only the muscles of the neck. Sometimes, in the spasmodic contortions of the victim, the spinal column is snapped.

Not for the first time Quade cursed Von Zorn's ruthlessness. The Chief would risk dozens of lives if he saw a chance of getting a hit picture. Yet, somehow, few objected. Something of the old theatrical tradition, "the show must go on!" had survived in a queer, wry fashion in the film industry. Hollywood on the Moon laughed at duty—outwardly. But a subconscious traditional loyalty and pride made men go uncomplaining to almost certain death, because the Titan film industry is rooted in the great days of the theatre—the days of Booth and Drew and Barrymore—and such a heritage is not easily forgotten.

Knowing this, Quade smiled a little, but not happily. Peters had died with his boots on. And the audiences viewing *Doom World* would neither know nor care.

A cry came from the left. Quade glanced up, turned toward the gate in the electrified barrier. He flung it open and started to run in the direction from which Kathleen's voice had come.

CHAPTER V

EXTERIOR: The Plutonian set, near Quade's camp. Afternoon.

CARUSO was pleased with himself. The singing frog sat in the middle of the road, the pouch in his throat pulsing rhythmically. He was eying Kathleen and Argyle and Baker. Here were more of these hideous but kind-hearted two-legged monsters. The other two-legged things had given him food and jabbered at him. Perhaps these new ones would do the same. True, they were *very* ugly—much too elongated and whitish, and bald in the wrong places—but they couldn't help that.

Caruso bowed, clasped his hands and sat up on his hind legs. Through some quirk of memory—perhaps the conditioned reflex Quade had suggested—he began to sing. Kathleen gave a soft little cry as the furry frog caroled cheerfully.

"Where the Martian moons ride over—"

Ignoring the girl's laughter and the chuckles of Argyle, Caruso continued on to the bitter end. Then he opened his mouth to its widest expanse and chuckled companionably.

"Somebody stealing your thunder," Argyle said to Baker, who was not pleased. "Wonder what it is?"

"Lord knows," Kathleen said for him. She knelt and gingerly stroked Caruso's head. He looked puzzled, nibbled at the girl's fingers, and giggled in an inane fashion. With great haste he began to wash Kathleen's hand with his mobile tongue.

"Likes the salt," Argyle said. "All animals do, even radioactive ones, I suppose. Let's get going, Kath. The sooner we reach Quade—"

She got up hastily, her face shadowed.

"Yes. Let's hurry!"

They kept on, trailed by Caruso, who occasionally made frantic leaps in an attempt to reach Kathleen's hand with his tongue. It was not long before they rounded a curve in the road and found themselves facing the gigantic snake-headed, turtlelike creature that Quade had encountered. It was still wondering what had happened to Quade, and pondering over the advisability of searching for him.

"Look out," Argyle said softly. "That's a Tank—dunno the Latin name, but it's bad medicine. Kenilworth told me it has—uh—variable metabolism."

Caruso gazed at the Tank with undisguised horror, and rapidly departed through the shining trees. Baker turned white and looked around quickly. Kathleen said, "Variable—*what?*"

The monster's dangling tongue lifted as the Tank tested the air for sensory vibrations. The snaky eyes focused on the three. It moved forward ponderously.

"Metabolism," Argyle told the girl. "I don't remember just what Kenilworth said, but it's like the terrestrial sloth—sometimes. Moves very slowly—low metabolism. But it isn't con-

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stant. Sometimes the metabolism gets speeded up for a while when one or two of its glands get into action. Same principle as the human adrenal glands—peps us up for a little while. Food stimulates the—"

HE had been edging the girl from the road. "Kathleen," he said quickly, with a side glance at the Tank. "See that hollow tree? It can't reach you in there. If the thing comes to life, duck for that hole. I'll lead it away." He didn't mention what Kenilworth had told him of the Tank's phenomenal speed when its metabolism was increased by the secretions of certain of its glands.

Luckily, the exciting hormones that were pouring into the Tank's blood stream automatically released chalones—a depressive internal secretion which had just the opposite effect. This made the monster look sillier than ever, but provided one of nature's check-and-balance systems. Otherwise the Tank would have eaten up every other form of life on Pluto.

The snaky head suddenly moved faster. Without warning it flashed down for a few feet—and as abruptly stopped, to continue its slow descent toward the humans. The chalones were momentarily stronger than the hormones.

"In you go," Argyle snapped, and pushed Kathleen toward the hollow tree. She was sent sprawling as Neal Baker, white-faced, shouldered her aside and made for the refuge. Argyle snarled, "Cut it out, Baker!" He tried to pull the film star back.

Baker turned, threw a vicious punch at Argyle's chin. The old-timer wasn't expecting that, and went down with a thud. Meanwhile the Tank was swinging into action; hormones flooded into its blood stream.

Kathleen shrank back against a tree, watching with wide eyes as Argyle got up, a grim smile on his scared face, and gripped Baker's collar as the star tried to crawl into the hollow tree. Baker writhed, twisted free, sent another blow at his opponent's face. But Argyle's head jerked aside, and the punch slid past harmlessly.

The two men grappled. The Tank's snaky head flashed down, dug up a fountain of dirt where the fighters had been a moment before. The monster remained unmoving for a space, though its eyes rolled sideward to examine its prey.

The knapsack on Argyle's back handicapped him, and he was no longer a young man. But experience had toughened him, so the struggle was fairly even. Kathleen had no weapon. She hovered above the two men, waiting for an opportunity to snatch a gun from its holster.

The Tank turned; once more its gaping jaws moved down toward Argyle and Baker. Kathleen screamed warning just in time. They rolled aside, still fighting; the huge jaws ripped cloth from Argyle's back. The monster froze, glaring. Its lolling tongue writhed grotesquely.

Just then Tony Quade came running along the road and saw what was happening. With an angry curse he tore the two men apart, snatched a gun from Baker's belt. The familiar touch of the cold metal was heartening.

With two well-placed bullets he blew off the Tank's head.

The monster did not seem discommoded. It stood quietly for a time, the bleeding, raw stump erect, and then turned to wander blindly off, knocking down trees as it proceeded. Luckily it headed in the opposite direction from the camp.

LOUD, hungry noises spoke of the approach of other creatures. Quade gripped Kathleen's arm, snapped a curt command at the two men. Quickly they raced along the road. Not until they were safely within the electrified barrier did Quade speak again. Then it was only to swear at Kathleen.

"What the devil are you doing here? You ought to have more sense! These creatures—"

Ignoring his anger, Kathleen swiftly explained what had happened. Quade whistled.

"That's nice! You say Kenilworth's trying to fix the generator? Let's—see!"

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He hurried to the televisor, spun the dials experimentally. For a moment there was no sound. Then a low humming came, and a face, blurred and wavering, swam into view. They saw Kenilworth's face, strained and smeared with dirt.

"Quade!" the biologist yelped. "For God's sake! I've been trying to reach you for ten minutes! Are you okay?"

Kathleen broke in. "We just got here—Blaze and Neal and I. I told Tony what's happened. Is the power on?"

through some obscure vibration—and waited. Argyle got out his guns. Neal Baker rushed into the hut and remained there.

"What's wrong?" On the televisor screen Kenilworth's thin lips were white.

"As near as I can figure out," Quade said slowly, "you've made the monsters too damn real. Their brains are in complete control. The receiving apparatus in the brains isn't strong enough to overcome the creatures' natural neural impluses. All it does is irritate them—

Penton and Blake

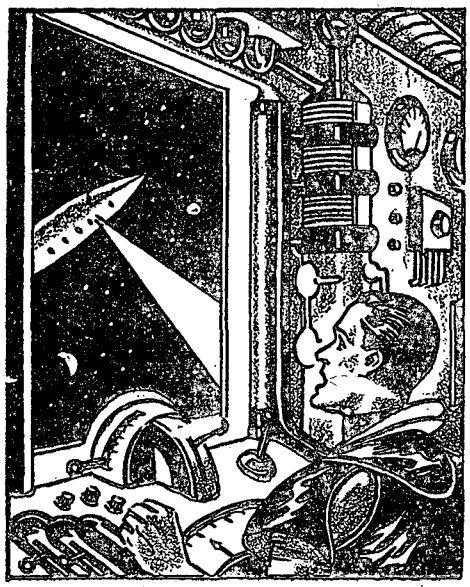
Return in

THE BRAIN PIRATES

A Novelet of Scientific Exploration

By

JOHN W. CAMPBELL, JR.



—in the Next Issue of

THRILLING WONDER STORIES

"Yes. Try a keyboard. The power's on full."

Quade found a control board, pressed several keys. He said into the televisor, "It'd better work. Something's coming this way—in a hurry!"

In fact, several things were coming. To be exact, there were two Plutonian devils, about a dozen of the vicious, tentacled flying lashes, and a number of the deadly snakes. They advanced to the electrified fence, hesitated, apparently sensing its menace—perhaps and they've located the source of that irritation. They're heading this way—lots of them."

Loud bellows and crashings in the shining forest spoke of the advance of a horde. Several more monsters came toward the barrier and halted—waiting. They scattered, and from the trees marched a gigantic, headless thing that rolled forward brainlessly, insensitive alike to the electric shock of the fence and the bullets that Argyle sent at it. It was the Tank, full of hormones and

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rushing forward with insane purposelessness.

It smashed down the fence, crushed a lash under one stumpy foreleg, and hurried on, demolishing the hut as it passed. Almost torn to bits by Argyle's bullets, it went through the other side of the fence and disappeared into the forest. Through the gap in the barrier surged a horde of monsters.

The snakes were deadliest. Argyle blasted them out of existence, but they poured from the forest in a never-ending stream. The lashes leaped and sprang to meet destruction. The huger monsters came forward to death, heedless of all but the irritation within their brains that drew them toward its source.

QUADE was frantically working on an instrument board.

"Kenilworth," he said breathlessly, "haven't you any more power? I can't—"

"Wish I had a ray-gun," Argyle flung over his shoulder. "I'd burn 'em to—"

Quade's eyes widened. He sent a swift glance at the monsters, pouring through the gap in the fence to be blasted to nothingness by Argyle's bullets. One of the guns clicked on an empty magazine, was flung aside.

"Kenilworth!" Quade cried. "What's the range of your waves? You told me—"

"Forty meters to seventy millionths of a centimeter. I'm using ten meters—"

"Get it down!" Quade's fingers were playing over the keyboard. "Down! Below three-hundredths of a centimeter. Heat waves, Kenilworth—*heat waves!*"

The televisor screen went blank. Nothing happened for a second. A lash got past Argyle, bounded toward Kathleen. Quade blew it to bits.

Then, quite suddenly, the monsters died. It was unspectacular. All of them hesitated, made a few brief, tentative motions of retreat—and died. The lashes collapsed in a wormy huddle of tentacles. The monstrous Plutonian devils simply lay down and stayed there. The serpents coiled and twisted and stopped moving.

All over the Plutonian forest set the bellow and roar of life died. Two minutes after the first lash had collapsed a great hush brooded over the cavern. The robots were dead.

"Whew!" Argyle exclaimed. "Are they—finished?" He was gasping for breath, blood-smeared.

"Yeah," Quade said. "Heat did it. Kenilworth broadcast heat waves, the receivers simply got red-hot—and fried their brains to a crisp. Lucky the receivers were adjusted to a wide range!"

A muffled groan came from the wreckage of the hut. Neal Baker crawled out, unhurt but vociferous.

After a frantic glance around he suddenly realized that the monsters were no longer a menace. He listened while Quade spoke briefly on the televisor to Kenilworth.

"Send out a car right away," Quade finished. "We'll—"

Baker peered over his shoulder. "Send a photographer, too," he suggested.

Then he found Argyle's discarded gun and practiced various poses with the dead monsters until the car arrived. The others left him there, arguing with a cameraman who wanted a few pictures of the robots without Baker brandishing his pistol in the foreground. . . .

CHAPTER VI

INTERIOR: Froman's Mercurian Theatre. Night.

THE System's greatest theatre was a blaze of vari-colored brilliance. *Doom World* was having its première, after several sneak previews from which the cast had been rigorously excluded. Neal Baker was there, resplendent and aloof in a box. Von Zorn was there, his toothbrush mustache carefully waxed.

Blaze Argyle and Kathleen and Quade were there, and on Kathleen's lap was Caruso, bright-eyed and interested. Apparently the singing frog had

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not been a robot; he had been a genuine mutation born to one of the monsters. So he had escaped the general holocaust in the Plutonian set, and Kathleen had discovered him the next day wandering forlornly about the cavern.

Somebody made a speech. Somebody else sang, and Caruso vigorously joined in the chorus with such gusto that an usher hastily removed him.

Blaze Argyle was rather happy. Since his decline in films he had never expected to see his own face on the screen again, and now a little thrill of expectation went through him. Of course he wouldn't get screen credit. Neal Baker had promised to see to that, for Argyle had made a lifelong enemy of the crooner.

It didn't matter. Naturally Baker was co-star, and his word was law, even though he ordered the cutting crew to slice out all Argyle's good scenes. That was the way it had been done in the old days. When Kathleen had learned what Baker intended, she had gone off to quarrel with Von Zorn, but she hadn't told Argyle the result of that interview. Well, he could guess.

Kathleen moved closer to Quade and squeezed his arm, and he returned the pressure.

"Hi, Fathead," he said.

She made a horrible face at him.

"Hi," she returned.

Quade quirked up one eyebrow.

"So you turned down an invitation from the great Neal Baker and came to the première with me instead, eh? Afraid you'd get your block knocked off if you hadn't?"

"Go chase a meteor," Kathleen said, and feeling somehow that the words were inadequate, she pinched her companion heartily. Quade merely chuckled. Kathleen was herself again.

VON ZORN twisted in his seat to stare at Argyle. Then he glanced up at Baker's box, and a malicious little smile dwelt on the film magnate's simian face. Baker saw the look and, misunderstanding, bowed and grinned genially.

With a fanfare of trumpets the curtains parted. The screen lit up with the credit title:

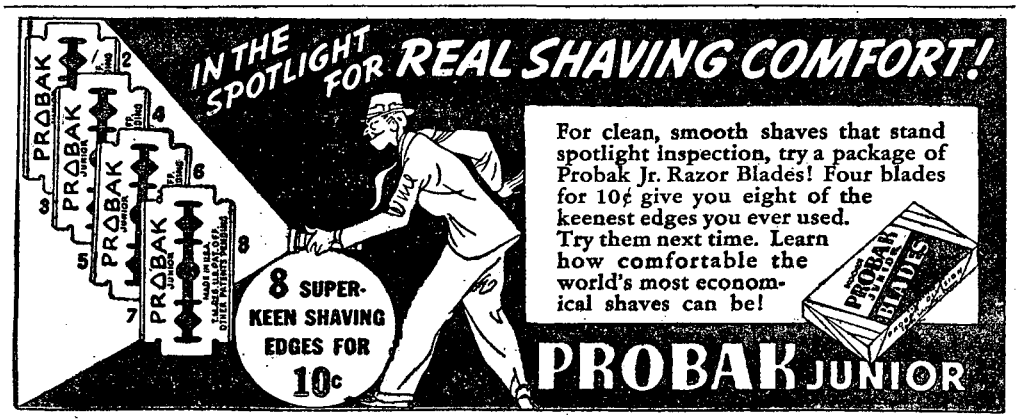
NINE PLANETS FILMS, INC.,
Presents
BLAZE ARGYLE
and
KATHLEEN GREGG
in
DOOM WORLD
with Neal Baker

IN THE NEXT ISSUE

Gerry Carlyle, Globe-Trotter of the Future,
Embarks on Her Strangest Quest in

SATELLITE FIVE

A Novelet by ARTHUR K. BARNES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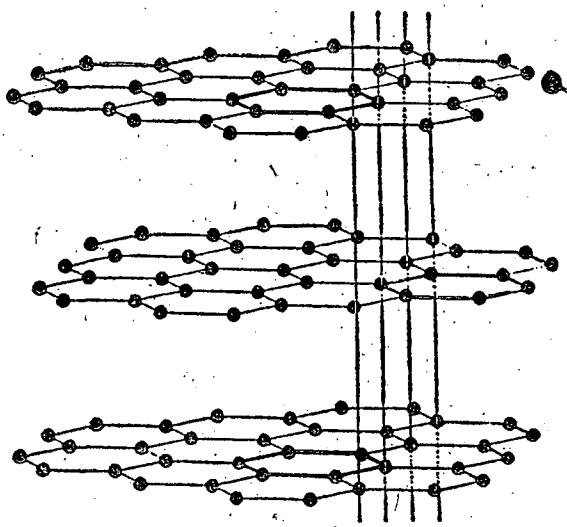
THE NATURE OF THINGS*

By

SIR WILLIAM BRAGG

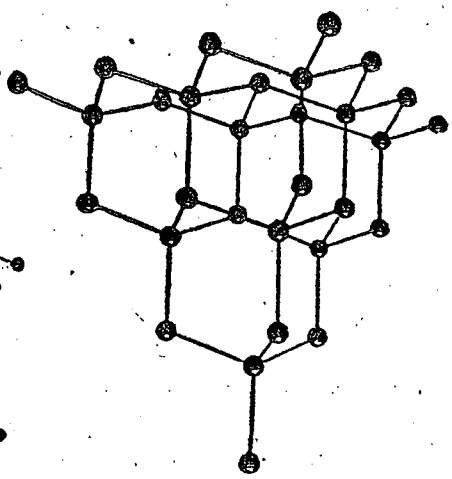
President of the Royal Society; Director of the Royal Institution of Great Britain and of the Davy-Faraday Research Laboratory.

THE phrase, "The Nature of Things," would be very indefinite were it not that it is old and has acquired a somewhat conventional meaning. It suggests that if we look beneath the surface of things we may find some explanation of their external appearances and behavior. That was the idea in the mind of Lucretius when he wrote, two thousand years ago, his famous poem "De Rerum Natura"—"Concerning the Nature of Things."



Diamond Model

The model shows the arrangement of the carbon atoms in the diamond. It says nothing about their sizes or shapes. The distance between any two centers is 1.54 Angstrom Units, of which 250 million go to the inch. Compare this with the graphite model.



Graphite Model

The carbon atoms are here arranged in nets of which the meshes are regular hexagons. The nets are separately strong but slide over each other very easily. The arrangement of carbon atoms in diamond gives the structure its characteristic hardness and strength; the arrangement of the same atoms in graphite makes it useful as a lubricant.

*NOTE: This article by one of the world's most distinguished scientists is published for the first time in this country by THRILLING WONDER STORIES. It originally appeared in THE LISTENER of London.

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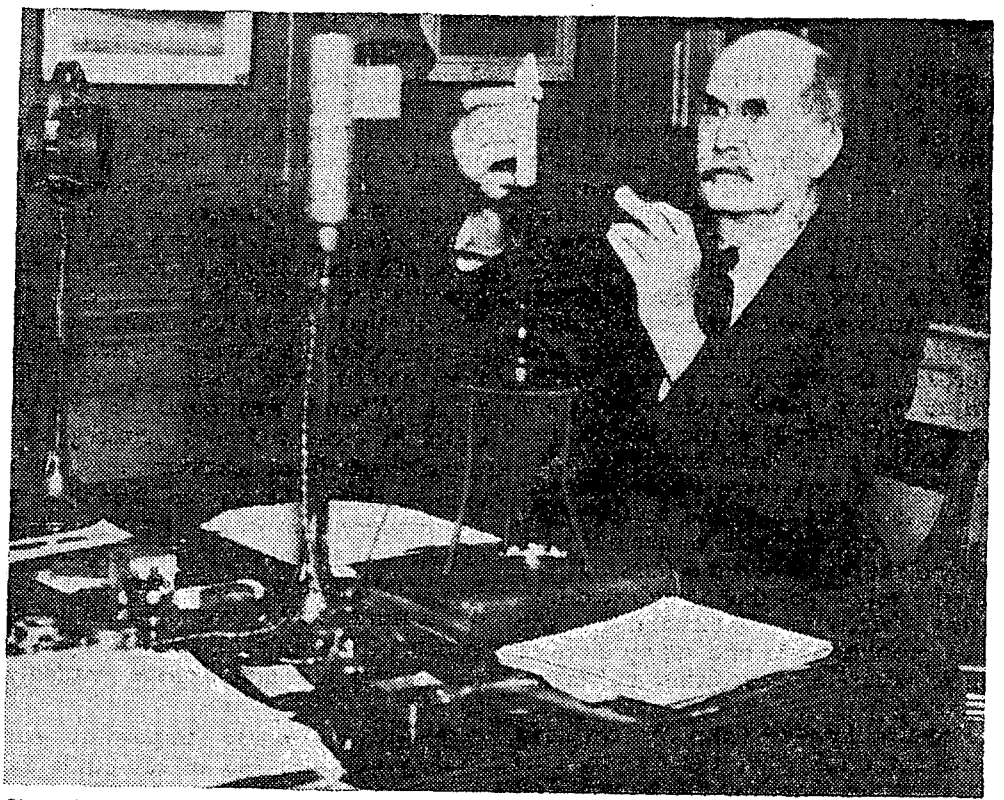

Sir William Bragg, Nobel Prize winner for his work on X-rays, is shown lighting the tiny flame in London which flashed across the Atlantic in a split second to turn on the lights in the new home of the New York Museum of Science and Industry in Rockefeller Center. As Sir Bragg lighted the candle, he sat at the desk at which Michael Faraday labored a hundred years ago to give the world electricity.

He imagined that the things of the world were composed of minute indestructible particles, too small to be seen by the eye: it was little more than a guess, but it was a good one. There was truth in what he wrote, though his atoms were not very like the reality.

In modern times we have actually penetrated below the surface of things and have foresworn guessing except in so far as a certain amount of it is necessary for the ordering of inquiry. Three centuries cover the history of experimental science. All its tremendous developments and the changes which it has brought into our world are comparatively new.

There is no sign of slackening. We are urged forward in part by the feeling that we have the power of inquiry and desire to exercise it. We believe, too, that we ought to be able to use what we learn to good advantage, and if we are disappointed sometimes in the uses that are made of discovery, we feel that our inquiry must also include the reasons for such misuse.

The amount of the knowledge that has been acquired is, of course, enormous. Out of it I will, if I may, draw a few broad generalizations which have a direct application to ourselves, our bodies and our minds.

Consider first the purely material side of our subject. How do we look below the surface of things and what do we find there? The trained eye can, of course, see much that escapes ordinary attention. The expert in any craft finds in the appearance of his

THE STUDY OF ATOMIC SYMMETRY

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materials a book which he alone can read. But to get well below the surface of things we must sharpen our senses by providing them with various instruments. Scientific instruments, it is to be remembered, are nothing more than reinforcements of our powers of seeing, hearing and feeling.

Perhaps the most effective has been the microscope, which takes us directly into those regions of minute details and processes in which our normal vision can no longer be our guide. There are the delicate balance of the chemist, the thermometer that deals accurately with temperature and owes its importance to the fact that heat and temperature must be observed with an accuracy far beyond the limits of our senses. There are the telescope, that penetrates into space, electrical instruments, the photographic plate and many another aid to accurate observation and measurement.

Besides these instruments we have used certain special agents, such as electricity, magnetism and x-rays. The collection of alembics and retorts, that we look at curiously in the pictures of the old alchemist, has developed into the rich equipment of the modern laboratory.

ATOMIC SYMMETRY

WHEN, with these aids to vision, we look below the surface, what do we find there? Most important of all, perhaps, is the discovery that all things are composed of atoms of a limited number of kinds, all the atoms of each kind being very nearly alike. Then we find that these atoms exert forces on one another, and form companies called molecules.

Thus, for example, the molecule of water contains two atoms of hydrogen and one of oxygen. In the processes of Nature the molecules are formed, broken up and reformed, and in this way the business of the world is carried on. Nature is the compositor that picks out the letters from the boxes, joins them into words, breaks up the type and again frames other words of different meaning.

One of the greatest of the discoveries of the last century was the part that is played by heat. It was found that heat was a mode of motion. In all bodies all the atoms and molecules move continually without rest, vibrating to and fro or shifting their positions among the crowd to which they belong. It is largely due to this motion that molecules and assemblages of molecules are broken; and to its slackening that recombination takes place, as in the simple case when a substance is melted and then cooled once more to the solid form. When it was found that motion could be measured as a quantity, and transferred from substance to substance, when the famous principle of the conservation of energy was enunciated and proved, it became possible to consider and to handle the processes of Nature with that understanding which, as Kelvin said, comes only with the power of quantitative measurement.

Then the vastly important part played by radiation of all kinds has come to be understood. We know now that the light that can affect our eyes, if we think of it as an ether wave, has a wave length lying between narrow limits; whereas waves of all lengths exist, ranging from the long waves of radio-telephony to the very short waves of Roentgen rays and radium, and all these play an essential part, though they have no effect on our eyes.

We see also, though not yet so clearly as we should wish, that a strange relation exists between matter and radiation, and that moving atoms and ether waves are not so very different in their nature and their effects.

Quite recently the use of X-rays as a very fine and delicate form of light has enabled us to look still more closely into the constitution of things, and to discover the remarkable tendency of Nature to arrange atoms and molecules in regular array. In this way are formed structures of beautiful design which, if the formation is carried far enough, are the crystals that we admire for their form and appearance. But this tendency is displayed in all solid

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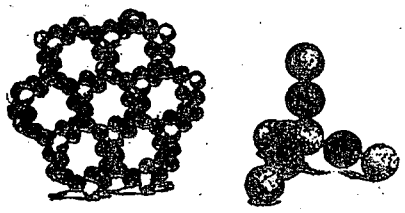
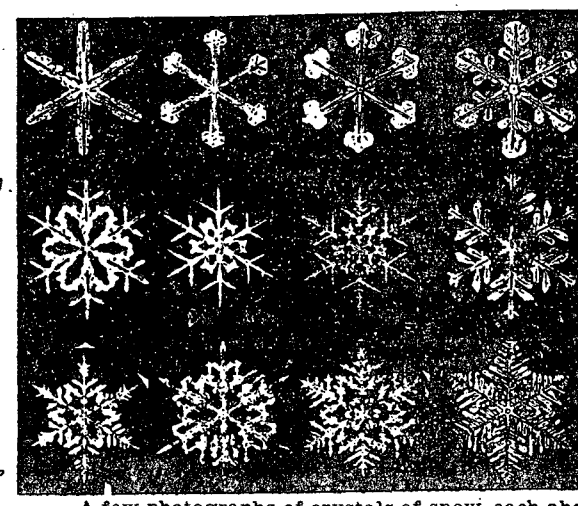


Figure showing the disposition of oxygen and hydrogen atoms in the structure of ice, oxygens white, hydrogens black. The hexagonal character foreshadows the hexagonal forms of the crystals of snow and ice. Right above: close-up of a smaller part of the structure. The model says nothing about the form or relative sizes of the atoms.



A few photographs of crystals of snow, each about a tenth-of-an-inch in diameter.

bodies; it is only because heat or other disturbing influences prevent it that the crystalline arrangement is frustrated before it is sufficiently extensive to be visible.

With the help of X-rays we find the patterns which Nature uses in the formation of rocks and metals and the materials of the earth, and indirectly we see what element of the design leads to each characteristic property. This regularity of arrangement, this crystallinity, is also found in all the organisms of life, and indeed is seen to be a fundamental necessity to the process of living.

THE POISON OF POWER

THUS, the closer examination in which every aid is brought to bear gives us a conception of the nature of things which the ordinary senses do not perceive. As I have already said, I would like to refer to some consequences of this enlarged vision. First, the material consequences are obvious. The use that is made of the new knowledge changes the face of the world, and alters our way of life. I need not spend time describing its application to medicine, to industry, to our businesses and to the pleasure of all those who take an interest in the world in which they live; and, let us say with sorrow, to war.

It is important, by the way, to remember that discovery cannot be directed toward good use as against bad use. There are those who suggest that the scientific worker should not direct his energies toward the acquisition of knowledge if it can be used to injure his fellowmen. As reasonably could the maker of automobiles be told to refuse construction of cars for the hit-and-run drivers.

Should then, it might be asked, all discovery be avoided? Apart from the fact that those who wish to discover for evil purposes will certainly do so, even if the better disposed refrain, it is surely a sad negation of human powers to adopt so badly the principle of "safety first." Why should, or indeed one might say why do, the better disposed avoid the use of a splendid instrument? Why should the doctor leave the use of the automobile to the thief?

While our study of the nature of things enables us to use them for the satisfaction of our desires, good or bad, and enlarges our conception of the achievements that are possible to us, it tells us at the same time how small we are relatively to the Universe in which we find ourselves, how narrow are the limits that normally bound our actions and our thoughts.

The astronomer's searches in the depths of space make us feel the relative minuteness of the scale on which

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we live, but there are other and even more powerful reasons for humility. As I have already said, the light waves that are visible lie within a very narrow range: useful indeed, for what could we do without our eyes? But they do not tell us of all the matters which are of importance to us. There are bacteria that are more deadly than wild beasts: yet we should never have known of their existence, nor learned how to fight them, had not the study of the nature of things sharpened our perceptions.

Our eyes are insensitive to the radiations that could tell us about them, and indeed to most of the radiations that exist. The world is ablaze with light which we cannot see. So also it is full of sound that we cannot hear; and our touch is not fine enough to perceive more than a very little of the actions that surround us.

OUR LIMITED VISIBILITY

THE Athenians built an altar "To the Unknown God." To the multitude that may have appeared to be no more than a wise precaution against the consequences of an unintentional neglect of some jealous deity. But surely there were some who felt that all the worship to which they had already given a form was but a part of what would be given if their knowledge were less imperfect. The unnamed altar was their tribute to the vast unknown.

This is the position to which we are led also by the study of the nature of things.

It is because visibility is, so to speak, so limited and because we find that every prophecy needs correction when we come nearer to its subject, that it seems futile to put into our anticipations any more detail than is required to keep us on a steady line of advance. And are we not forgetting how little we know, and how dimly we perceive when we are quick to suppose that different ways of searching for knowledge are incompatible, knowledge which has to do with the immaterial as well as with the material?

Faraday, for example, has been criticised because he was both an experimenter in his laboratory and a member of the small company of Sandemanians. It has been said that when he went into his chapel he had closed behind him his laboratory door. But was this really inconsistency? Of all men he was particularly aware of the littleness of what he knew, and the vastness of what might be known. In the laboratory he worked at his great theory of the existence of a connection between the various forces of Nature, light, heat, electricity, gravity and the rest.

His successes made his name famous and contributed largely to the prosperity of this country. In his chapel, and outside it as well, he put to test the belief that charity was the link that could and would bind men together. There is no inconsistency, for without charity the study of the nature of things loses all that makes it worthwhile, and without knowledge of the nature of things the experiment of charity cannot be fully tried.

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THE SATANIC CYSTS

Gently the Cyclopyte lifted the watch from my pocket

A Meteorite from Unknown Space Spawns Incredible Life-Forms Armed with Unholy Powers!

By PAUL CHADWICK

Author of "Stairway to Hell," etc.

CHANCE had a good deal to do with the finding of the cysts. In almost all scientific discoveries chance has played its part. There is the classic case of Newton and the apple. There are the Curies, who might never have discovered radium if a superstitious Oriental, visiting their laboratory, hadn't broken their jar of luminescent uranium salts, forcing them to refine the particles over again.

And there was my Great-uncle Theron's meteorite and the part that chance played in revealing its terrifying secret after a century of obscurity. Valerie, my sister, was the unconscious agent of chance in this case.

If our Connecticut farmhouse hadn't been filled with week-end guests, if she hadn't insisted on putting Professor Dayton in the south attic when he turned up that Saturday night, the un-

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holy potentialities of the meteorite might have remained unknown for another century.

Maybe you'll say it wasn't chance. Maybe there are purposeful forces in the Universe, malign as well as beneficent. Maybe these forces brought about the visit of Professor Dayton and the other circumstances just so that an evil, too long dormant, might be loosed upon a world already carrying more than its share of hate, oppression, and cruelty.

But I prefer to leave such speculations to the metaphysicians and mystics. I am a student of science. I don't believe in predestination or determinism. I think there is a certain element of blind chance working in and through all things. I think that even Nature is capable of making mistakes, as is evidenced by the suicidal over-specialization of certain forms of reptiles and Mammalia.

It was a mistake certainly that Professor Dayton was put in the attic with his portable radio that is as much a part of his personal equipment as his leather case of noxious cigars. Why a man of Dayton's scientific standing should want to listen to every banal advertising program broadcast is one of the eternal mysteries.

But it was quite common for him to work on some difficult problem in biology with a crooner gargling at his elbow. His notion of the ideal environment for concentration was a room blue with cigar smoke and vibrating with raucous noise.

He hadn't been in the old attic five minutes before he asked my help in stringing the inside aerial for his radio. The instant it was up he went to his dials, his round, inquisitive face beaming, for, as he said, one of his favorite programs, Mandy and Magnolia, was about to go on.

BUT when Dayton turned the switch of the instrument nothing came out except a series of violent sputterings and snappings. "Static," he muttered, and commenced working feverishly, trying to get the "bug" out before Mandy and Magnolia began their caterwauls.

He soon found this impossible. If anything, the snappings became louder as he continued to experiment.

He looked at his tubes and seemed to find them all right. I suggested then that there might be something about this room that was bad for radio reception. Dayton doubted it; but, just to make sure, we took the instrument into another part of the house and tried it. There it worked perfectly. Mandy and Magnolia came on punctually and vociferously.

But now Dayton, who was always the inquisitive scientist at heart, was more interested in why the radio hadn't worked in the attic room than he was in the program. We had no telephone which might have interfered. The electric light wires came in on the north side of the house. I, too, was curious.

We went back toward the attic with the radio, testing it room by room. But not until we got inside the attic door did those strange snappings begin again.

Then Dayton moved the radio slowly around the attic, and we found that the static sounds were strongest in the southwest corner. At this point was a pile of old boxes, books, and tarnished scientific instruments that had belonged to my Great-uncle Theron.

One by one Dayton removed these things, testing their effect on the radio by a process of elimination. Suddenly his fingers trembled and his voice rose in pitch as it always did when he was excited.

"See here, Gregg!" he said excitedly.

He had lifted a pock-marked lump of reddish material from an ancient box. As he moved it toward the radio the snappings grew louder. As he held the rusty lump close to the box the radio's sputterings became almost deafening.

"It's Uncle Theron's meteorite!" I shouted above the noises in the box.

Dayton hardly heard me. His eyes were shining with excitement. He walked away from the radio, and, when he passed through the door of the attic with the lump in his hands, the static sounds stopped and I could hear Mandy and Magnolia doing their stuff.

Then Dayton came back and switched the radio off. In the silence

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his voice was still high-pitched.

"Amazing, Gregg! This must be a lodestone."

It sounded reasonable to me, though I'd never known that Uncle Theron's meteorite had magnetic properties. But when we got some steel needles Dayton's theory fell down. The meteorite had no effect whatsoever on the steel.

"Good Lord," said Dayton, "there's only one other explanation. This chunk must possess some sort of radio-active element. You've got something here, Gregg. We ought to investigate it."

Valerie and her guests were calling for us to come down and join them; but Dayton and I had become almost feverishly interested in that old lump of rusty rock. We locked the attic door. Dayton began filling the air with his foul cigar smoke.

I took the meteorite out of his hands and examined it. I noticed something then that I had remarked about long years ago when I first saw the thing, but to which I had attached no particular importance. My uncle, or someone, had broken a corner off the meteorite.

I TOOK an old geologist's hammer and began chipping at it, too. "Careful," said Dayton. "Don't spoil it. The radio-activity is in the stone itself. You won't learn anything by doing that."

But he was wrong. A corner of the brown stone came off in my hand. Embedded in the rufous material were several grayish capsules. I scraped them with my penknife. They were exceedingly hard. One of them came out of the matrix and rolled around in my palm. I pried another one up, compared them.

Their capsulelike shape, their absolute uniformity, amazed me. Dayton was amazed, too. His eyebrow was cocked up. There was a long ash on the end of his now forgotten cigar.

"What in blazes are those, Gregg?" he gasped.

I didn't answer. My fingers were trembling. In the main lump of the meteorite, next to the piece I had broken off, more of the strange capsules were visible. I know something about mineralogy, but I had never seen anything like this. No crystals or jewels I had ever looked at were shaped in this fashion.

Professor Dayton voiced my own thoughts.

"Those things are more like animal fossils than minerals, Gregg. They—they look like some sort of cysts."

"Who ever heard of fossil remains in a meteorite?" I said. "This *is* a meteorite, too. It was picked up during the meteoric showers in the years eighteen hundred and thirty-three to eighteen hundred and thirty-nine, described by Professor Olmstead of Yale. And you know, Dayton, that meteorites such as these come from a nebulous body revolving around the sun on an elliptical orbit. It's when the aphelion of this meets the Earth's orbit that we get meteoric fireworks. There *can't* be any fossil remains in meteors. The nebulous stuff that spits them out is lifeless."

"But supposing a meteorite broke through interstellar space from some far-off inhabited planet, then got caught up and whirled along with a nebulous body? It might land on Earth's surface in the course of a general meteoric shower. I tell you, boy, those things look like animal cysts."

We stared at each other.

"You're familiar with the so-called 'Dust Theory' of evolutionary genesis, I presume, Gregg," Dayton said gravely. "Even in this materialistic age, there are many biologists who, like Hans Driesch, believe in a principle of entelechy. They don't think that life can be created from colloids, electrons or other inorganic matter. They think that living spores must have started life on our Earth and that these first germlike spores drifted through interstellar space encysted, along with cosmic dust. It's not such a bad theory when you consider that the bacilli of many malignant diseases can live in cyst form for centuries and withstand tremendous heat and cold."

I nodded again.

"But these are too big for spores or germs."

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"Of course, but if encysted bacilli can come from outer space, why not possibly some larger form of life?"

I nodded again, and for the first time, with a sort of spine-chilling sense of omniscience, I connected these meteoric capsules with my Great-uncle Theron's strange death long years ago.

Often I had heard my father tell of it. My uncle, a worthless, impractical dreamer and gadget man, had spent most of his life pottering around with inventions that never worked, never brought him a cent. He had let his farm go to pot, let his poor wife wear her life away with worry and drudgery. At the end Uncle Theron had retired suddenly to a small cabin up in the hills to do what he termed, "Important scientific research." There the cabin had burned one night, presumably from an overturned lamp, and my uncle's charred body had been found.

But what had stirred my childish imagination most about the story was that the charred bodies of several small animals, unknown to anybody in those parts, had been found in the cabin, too. The community wasn't scientifically alive. The remains had been destroyed. People afterward regarded the whole story as merely another of the queer rumors that had followed my uncle all his life. But now I wondered, and I had an odd feeling along the back of my neck, the sensation a dog must experience when its hackles rise.

DAYTON said matter-of-factly:

"Of course, if those are animal cysts, whatever they once contained is now fossilized, and this fossilized material must hold some radio-active substance. It will be interesting to see—"

I cut him off, my voice shaking.

"They may not be fossilized, Dayton. They may be alive still. You've just said—"

"Bacilli. Yes, but not cysts that size. It's incredible."

I told him about my uncle then; and Dayton was almost speechless with excitement when I finished.

"It's too utterly fantastic even to consider," he spluttered. "But, well, if there's anything in it, Gregg, you and I have something here that will stagger the scientific world. Let's test one of those capsules."

He did, turning on the radio again, moving the strange pellet back and forth. There was no doubt that the radio-activity emanated from it, for the snappings and cracklings continued when the meteorite itself was taken from the room.

Dayton borrowed my geologist's hammer then, picked up a metal paperweight, placed one capsule on it and struck it a resounding whack. The thing was hard, hard as flint. He had to hit it twice more before it broke. Then it smashed to pieces. All we got from it were some small bits of whitish filament like asbestos.

I was disappointed.

"I hope there's something to your wild idea, Gregg. This stuff is probably desiccated," Dayton said. "Encysted bacilli are desiccated, too."

"What's needed to make a cyst develop?" I asked.

Dayton took off his glasses, wiped them.

"Moisture and heat are the universal incubatives," he said.

At this point Valerie came in. When we showed her the capsules and told her something of what was in our minds she shuddered. A queer, strained look appeared on her face, as though her woman's intuition told her that we were somehow on perilous ground.

"Don't do it, Gregg," she pleaded. "Leave those things alone. Put them back in the corner and come on down. We're going to play bridge."

I think it was this that strengthened Professor Dayton's resolve to remain in the attic and experiment with the capsules. Bridge is a game he loathes.

"Every one to his own poison, Valerie," he said. "Gregg and I prefer meteorites to cards."

Valerie flounced out. I got a pan and filled it with water. We set this near an oil heater and dropped in the three remaining capsules that I had pried loose. Although their surfaces were as hard as flint, a small hand-glass had revealed that their shells might be porous.

But nothing happened that evening,

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and Dayton and I eventually agreed to go downstairs just about the time the bridge party was breaking up.

IT was twenty-four hours later, Sunday night, when the rest of the guests had gone, that Dayton called hoarsely to me from his attic room.

I went in. He was leaning over the pan by the heater. Most of the water had evaporated. The three gray capsules were only half submerged. But something had happened to all of them.

They had split open. And out of the cracks a viscid, protoplasmic substance was emerging. The things that had been dried filaments were now jellylike pseudopodia. Each capsule seemed to contain the body of a large amoeba, sucking up moisture.

We watched spellbound, adding a little water from time to time, as the protoplasmic bodies enlarged and the moisture in the pan diminished. The things grew so rapidly that we could see a marked change in them every half hour.

"Gregg, look, one is free," said Dayton suddenly.

It was true. One of the strange organisms had slipped entirely out of the cracked capsule. I could see it more plainly, and even now, though it was in an embryonic state, there was something about it that was horribly repulsive.

The creature looked more like a small jellyfish than anything else. It had a globular body. I could see a tiny nucleus in it with a vacuole that had begun to contract and expand. There were about two dozen of the pseudopodia, or jellylike arms, not shooting off at random as in an amoeba, but arranged around the globular body symmetrically. They hung loose, slack and seemed to be mere appendages.

We both became obsessed with a mounting curiosity that was like a fever. All that night we watched in spite of anything Valerie could say.

Next day Dayton canceled his appointments in Boston and stated his decision to remain on the farm. He was like a man possessed. "I want to see this thing through, Gregg, if it takes a lifetime," he said. "We're on the verge of a discovery that will make our memories immortal."

How great was the significance of the thing we were watching, even he didn't guess. Our organisms continued to grow in their pan all that day and the next. We took turns watching them, taking brief naps between, helping ourselves to quick bites from the kitchen, while Valerie watched us askance. We had pledged her to absolute secrecy. Fear of being laughed at would have sealed her lips, anyway.

It was at the end of the second day that the meteorite's organisms began to develop a faint epidermis. It was a mere milkiness on the outside of the globular body at first. Then it became blotched and faintly ciliated.

As I stooped over to examine it with a magnifying glass I saw the thing that enabled us to give the creatures a name. Close to the top of one rounded body in the new-formed skin I saw a circular spot like a rudimentary eye, with a score of tiny lenses. So we decided then and there to call them Cyclopytes.

Still they grew. Moisture seemed to be all they wanted at first. Then, when they were nearly as large as hen's eggs, we noticed that they began moving restlessly around the edges of the pan. Their pseudopodia had become stronger now and had also developed skin. With these they could move slowly in any lateral direction. We saw them lift their pseudopodia toward the edges of the pan and knew they were looking for food.

Dayton tried several things before he hit upon beef broth. I think it may have been his studies in bacteriology that made him lean toward the broth diet. For he still insisted at this time in regarding the Cyclopytes as giant bacilli. Anyway, the creatures would suck up the broth that was poured into their pan. With the nourishment the restlessness of the things ceased and they began to grow even more rapidly.

VALERIE came into the attic one day, took one look at them, and ran out weeping. She packed up her things, and, in spite of everything we could say, left on the early train to stay with a friend in New York. Professor

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Dayton and I were alone now in the old farmhouse with our three Cyclopytes.

The days that passed in quick succession were ones of intense scientific curiosity. A growing, deep-seated uneasiness that I couldn't hide from myself took root within me.

It was impossible that these hideous, monsterlike organisms had any real intelligence, but, as I looked into those Cyclopean eyes, I had the feeling more and more that they hid a dawning awareness. The myriad lenses of the eyes looked in all directions at once. I grew to have an obsession that they followed me in every direction as I went around the room.

We had brought the creatures down to the main part of the house now. They were too large for their first pan. I had remembered the old sap pans used for boiling maple sugar out in the barn. These served admirably as homes for the Cyclopytes. We packed the bottoms with sphagnum moss, for, while they wanted dampness, they didn't appear to like being immersed in water. Then we built board sides around the pans. Yet these seemed unnecessary, for the Cyclopytes made no attempt to crawl out.

At the end of each pseudopodium now was a forked division, almost like the claw of a spider crab. But there was no shell casing visible. The forks were soft, harmless. The creatures submitted docilely when I picked them up. They were as gentle as babies. They seemed to have no offensive or defensive weapons. They had no teeth. Broth was all they wanted to eat.

But the conviction that there was some sort of intelligence behind those eyes was growing on Dayton, too. He told me so one day, laughed rather shakily, I thought, and said: "I don't like the way those confounded animals watch me, Gregg. It makes a man feel haunted."

Yet nothing would make him leave the experiment and return to his job in the city. "This is the greatest thing that's ever happened in my life," he would say again and again.

We took turns getting fresh meat from the butcher and stewing up great kettles of broth. We made endless notes as we watched the things steadily develop. They were the size of pumpkins now; horrible, globular organisms, and they used their pseudopodia more and more.

I will never forget the day and hour that the Cyclopyte I was attending reached up with one of its pseudopodia and clutched at my gold watch fob.

While I stood breathless, trembling with amazement and horrified wonder, the animal curled its soft pseudopodic forks around the fob, and gently lifted it from my pocket. It held the thing in the air in front of its single eye. For long moments it seemed to stare. The other two Cyclopytes crawled over and stared, too. Then the watch was passed from one to another.

It was at that moment that the shocking truth came over me that these creatures were not animals in the ordinary sense. There *was* intelligence behind those eyes; a remote, eerie intelligence, as strange to me as the far-off planet or nebulae from which they'd come.

From then on I thought of the Cyclopytes as sub-human beings. For their pseudopodia became more and more inquiring. They would hold onto and look at any small object passed into their pan. At th[illegible] are intervals when I could bring myself to pick one up, their two dozen pseudopodia would move over my clothing, my face, feeling the buttons on my coat, lifting the fountain pen from my pocket.

SOMETHING like panic seized me then.

"Dayton," I said, "maybe it's time we let some one else in on this. Maybe we ought to turn these animals over to a zoo." I had a queer feeling of inappropriateness as I uttered that last word.

"Wait," said Professor Dayton hoarsely. "I know how you feel. I—but, well, let's hold out a little longer. Let's learn all we can before the public hears about them. Once their presence is made known we're likely to be thrust into the background. It's our find, Gregg. We deserve to get whatever is due us in the way of fame and prestige. There are signs that they're almost mature. Let's wait."

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If I had followed my instincts then perhaps tragedy and horror might have been avoided. And yet I'm not sure. Maybe our way was the best.

Dayton was right about their being close to maturity. Just as human beings seem to step suddenly from adolescence into adulthood, so the Cyclopytes developed even more quickly in the space of a few days.

Their skins became darker suddenly. It was moist now, and faintly blotched. Their pseudopodia strengthened as bones formed. Their single eyes took on a shiny, luminous quality that made them more horrible. Even now they were only about the size of large watermelons and it was ridiculous in a way that we should be afraid of them. Yet there was something about them that added to my strange, deepening fear. I had a premonition that something was about to happen; that, if we didn't make a change soon and get others to help us in caring for them, we might never be able to.

Dayton had tested the Cyclopytes with the radio several times. There was no doubt about it—the creatures were in some way radio-active. Somehow this didn't surprise me. I thought of the electric eel. If animals could give off electrical charges, why not radio-activity? But I should have attached more importance to a quality that no other animal in the world showed in such large measure. I should have realized that this radio-activity might be related to some other quality which the Cyclopytes hadn't manifested as yet. Logic should have told me that such seemingly helpless yet deeply intelligent organisms had some way of imposing their wills on other organisms around them.

The discovery of their unholy power came as simply as the discovery of the tactile grip of their pseudopodia. I was in their room giving them fresh broth one afternoon, when a sudden, strange impulse made me put the pan down.

I stood uncertainly for a moment, then turned, walked out of the house and to the barn. I went inside, caught a large hen and seized an ax. The thought flashed through my mind that this bird I had in my hands was one of Valerie's prize Brahmas and that I oughtn't to kill it. I tried to let go of it, tried to drop the ax. Perspiration broke out on my face. I struggled inwardly until my head began to throb. Yet all the time I was walking toward a chopping block. With one blow I decapitated the Brahma.

I laughed foolishly, went back to the house, plucked the chicken and made some fresh broth. As soon as it was done and cool I carried it to the Cyclopytes' pan.

It was only as they were drinking it with their short, toothless, trunklike mouths that I realized the full import of what had happened. The Cyclopytes had *made* me kill the Brahma. I was under their hypnotic control. There was more than intelligence behind those hideous, single eyes. There were powers present which human beings only dimly grasp, faintly perceive. These creatures didn't need great size or strong defensive and offensive weapons when they could make other creatures do their bidding.

In that first shocking moment of discovery all the horror and fear that had been rising in me for days came to the surface. In a sort of frenzy I ran into the kitchen, got a carving knife. I lunged toward the Cyclopytes' pan with the idea of slashing them to pieces.

THEIR three glittering eyes looked at me. They didn't even stop drinking their broth. But when I reached the pan, a strange, overwhelming powerlessness took hold of me. The strength left my muscles. My anger subsided. Stupidly I reached out with the knife and let one of the Cyclopytes take it from my hand.

Another great shock came a few moments later when Professor Dayton returned from the butcher's. I tried to tell him what had happened, and my brain became confused, my speech incoherent. All I could stammer was: "The Cyclopytes like chicken broth once in a while for variety."

"I know," said Dayton.

"You know?"

"Yes." He held up two plump fowl that he had bought at the butcher's.

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"But—but, how did you know?" I gasped.

He didn't answer. His eyes dropped from mine, and a deep flush mottled his round face. I realized then that he was under the hypnotic power of the Cyclopytes, too.

Things went from bad to worse after that. Our whole status changed in the house. From being two curious scientists, raising three strange, star-born animals to maturity, we became two mere slaves at the beck and call of three of the strangest, most horrible monsters that the world had ever seen.

We couldn't touch them, hurt them, destroy them. Even when we were out of sight their power still persisted. We could only serve them.

The day came when the unseen forces controlling us told us that the Cyclopytes no longer wanted to stay in their pan. We took them out, put them down on the floor.

They moved slowly, purposefully about the house, even ascending the stairs by means of their forked limbs. And, even as we obeyed these instructions to take them out of their pan, we also obeyed another. We got the meteorite, cracked it and dug out the rest of the capsules. Then we put them in a fresh pan of warm water.

There were sixty more of these pellets. Already we were slaves in the hands of three one-eyed creatures. Yet, against our will, we had set ourselves to raise an additional sixty of the dread things, helping them to reach maturity here on earth. No nightmare I had ever lived through was as bad as this.

For, though we couldn't direct our bodies into any action other than those things willed by the Cyclopytes, we could still reason abstractly. We saw plainly where our actions were leading. If the Cyclopytes could make us obey so easily, then it would be easy for them to make others obey, too. If three could control us, then sixty, reaching maturity, might control whole groups of men.

We saw that, from this old farmhouse in Connecticut, might spread a blight that would reach over the whole land and the world. We had no way of knowing just how powerful this radioactive hypnotism was. It might even be that one Cyclopyte could control a score, a hundred, a thousand men.

One thing we felt certain of—human beings must have personal contact with the Cyclopytes before becoming their slaves. For the people we met on our trips to the village seemed rational, free, cheerful. We realized that the Cyclopytes were keeping themselves hidden, biding their time until the other sixty reached maturity. And we were unable to warn the world!

I tried again and again to get some message through, telling of what was happening at our farm. But, though I went to the village and mingled with the people, my speech grew incoherent the moment I tried to mention the Cyclopytes. Their hypnotic power caused some sort of short circuit in the ganglia of my brain. After several of these attempts people began looking at me queerly. It was the same when I tried to use the telephone.

I ATTEMPTED writing next, but, even when I wrote to Valerie, my pen would only set down trite sentences. "It's warmer today." "The sun is shining." "Professor Dayton and I are both feeling fine." It was impossible for me to mention the Cyclopytes or even Valerie's Brahmas, all of which I had now killed.

The day I tried to run away in the car on my trip to the village to summon help before the sixty infant Cyclopytes reached maturity will always stand out in my mind as being particularly horrible. I thought for a time I could do it. Mentally I was determined, and I seemed to be reasoning clearly. I saw that I *must* get as far as possible from the farmhouse and by some means communicate to others what was happening.

But when I tried to turn the car off the village road toward the state highway leading to the city a palsy gripped me. My hands shook. Sweat poured from my face. I couldn't go on, though I struggled for many minutes. I was helpless, defeated. Slowly I backed up, and returned to the farm.

That experience was like a philos-

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ophic lesson in the futility of thought when it can't be translated successfully into physical action. I understood more clearly why so many of the world's great abstract thinkers achieve so little of lasting value. Thought and action must supplement each other if mankind is to benefit. From that time on I knew I was as helpless as any Roman slave chained in a galley. So was Professor Dayton.

It was impossible that the Cyclopytes understood all earthly phenomena or all that was going on in our minds. But they were able, apparently, to grasp our mental processes telepathically and to classify our impulses in a general way. The escape impulse, the destructive impulse directed toward them, the rebellious impulse, could be instantly detected by them and thwarted. Their uncanny, horrible intelligence made it possible for them to cope with their environment well enough to get what they wanted.

Daily they grew more at home. They appeared to have no ears and never made any sound themselves. Yet it was evident to us that they were mastering our language. For they made us turn the radio on and remained still with their single eyes fixed upon us while lectures and political speeches were broadcast. They made us read to them, too; simple things at first, then more and more elaborate ones, until a time came when we read aloud long scientific chapters from the encyclopedia.

Yet, despite this adoption of earthly culture, they were still fearfully subhuman in many ways. An intimation of the unspeakable horrors that lay ahead came one evening when I was compelled to take a knife and go hunting the collie dog that lived on a neighboring farm.

With my skin crawling and my thoughts in a turmoil I found myself stalking behind stone walls and bushes like a savage. I waited in semi-darkness until the dog came up to sniff at me, then stabbed him and brought his body home so that the Cyclopytes could have a fresh kind of broth. I was violently sick as I turned the poor brute's carcass over to Professor Dayton to cut up. But I saw by the haunted look in Dayton's eyes that he had had some even more soul-racking experience.

The next day I saw him, knife in hand, watching from a clump of trees while a farmer down the road plowed his field. It might have been the horses he was considering as game; but I had the horrible feeling that it was the man himself Dayton was eyeing. I realized with loathing that the Cyclopytes made no distinction between different kinds of flesh.

All the while the sixty additional monsters were growing up. It was to supply their insatiable appetites that we went farther and farther afield for food. I think the three adult ones must have realized that if we bought too many pounds of meat at the butcher's it would make us conspicuous in the village and might lead to an unwelcome investigation. They must have dimly realized, too, that if we murdered so that they might have food it would attract attention. Perhaps it was only this that prevented us from killing our neighbors at once. I know anyway that all Valerie's Brahmas were now slaughtered and that there were horrid nights when we prowled for miles around the countryside killing and stealing chickens and even sheep.

THERE was a night when I sneaked up to the window of a farmhouse, and looked with unholy speculation at the people sitting comfortably inside. Acting under the superior will of the Cyclopytes I was as dangerous as the most barbarous savage.

This made me understand once more the fearful horror that would come to pass when they began controlling groups of men. The human race would be plunged into complete barbarism again. Neighbor would turn against neighbor, county against county, state against state. There would be slaughter and civil war and destruction. The Cyclopytes would refashion the world according to their own ideas.

Just how they would go about bringing the country under their control I didn't understand until the evening I saw Professor Dayton writing.

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Never have I seen such a look of torment on a human face. His eyes were haggard. His cheeks were pale and dewed with perspiration. He was crouched over the old writing desk, dashing off note after note and quickly addressing envelopes. Yet his hand was steady. His motor nerves were being guided by the Cyclopytes.

I looked over his shoulder and saw that his notes were all alike. They said:

Dear Sir: I have a revelation to make of the utmost importance to the world of science. It bears so gravely on the future welfare of the human race that it should take precedence over anything you may be doing at the moment. Please come and see me at once at the address given.

J. B. S. DAYTON.

The names on the envelopes startled me as much as the note itself. I had a cold feeling inside my stomach. For Dayton was writing to a score of the country's most eminent scientists. Engineers, physicists, biologists, medical men, political economists. His own prestige was so great that most of these men would surely respond. They would drop everything and visit us at the farm. Then they, too, would become helpless slaves of the Cyclopytes.

The whole plan was so devilishly simple as to be appalling. The Cyclopytes had grasped the principle of Technocracy. They would first enslave the country's technicians, this being a scientific age. Through them they would reach leaders of industry, politicians, military men, and finally the whole populace. Once having saddled themselves on human civilization like monstrous incubi I had the feeling that mankind would never be even partially free again. Every man would become his brother's keeper. The whole world would become a vast and horrible totalitarian state after bloody revolutions and counter-revolutions had decimated its citizens. One-eyed monsters would be in control.

I was sick at heart as I saw Dayton continue writing, until our entire stock of paper and envelopes was exhausted. Then he sealed them and handed them to me, and I could feel by the way I reached out to take them that I had ironically been chosen to finish the job. I knew that when those letters were mailed and the great technologists began arriving all that was good and clean and worthwhile in human life would begin to vanish. Professor Dayton knew it, too. It was his word, his prestige that would bring about this horrible enslavement.

As I walked through the door to get the car and drive to the post office I got one more look at Dayton's face and saw there the tortures of a consciousness in unspeakable torment. Like one in a dream, moving mechanically, I backed the car out of the barn and headed for the village.

I don't actually remember covering the distance. It must have taken the usual twenty-five minutes. I didn't come back to life until, with leaden feet, yet unable to stop myself, I was almost at the door of the post office.

Then suddenly a feeling came over me that I hadn't known for days. It seemed that a dark, hideous cloud was lifting from my mind. It seemed that I was becoming free again; free of fears, free of the terrible repressions that had gripped me. My hands shook with excitement. I took the letters from my pocket, stared at them.

A GREAT, over-mastering rage filled my being. Like a man in a frenzy I grabbed the letters in both hands, tore them again and again, flung them away from me. I ground my teeth. I cursed and stamped the torn scraps of paper into the dirt, until people crowded around me, thinking I was mad. More and more came, staring.

But I flung them off suddenly.

"Out to the farm!" I shouted. "Quick! Professor Dayton is there. Something has happened."

I had the extraordinary strength of a man who feels the surge of new-found freedom in his veins; the thing that patriots, warriors, great humanitarians have died for. Freedom, the sweetest thing that the human race in all its dark history has glimpsed.

Freedom! I got into my car and raced back toward the farm, with a score of other cars trailing me. Something in my face, my voice, my actions

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made my fellow townsmen know that a momentous thing had happened.

And I saw the smoke even before I reached the crest of the hill. When I got to the top and looked down I saw that the old farm was burning. Pillars of dark vapor, tongues of flame, were licking out of its windows, its doors.

I raced ahead. Someone must have turned in an alarm by telephone. Because, as I stopped in the yard, I heard the distant siren of the town's old fire wagon.

But it could do little when it got there. The heat was too great. The house was already gone. We made a bucket brigade and saved a portion of the southwest side.

It was here, later, that we found the body of Professor Dayton and I understood all that had happened. By a seeming miracle he had fallen on his face, and his features, though smoke-blackened, were recognizable. Never have I seen such an expression of beatific peace on a human countenance. It was as though Dayton, in dying, had seen some great vision that even the smoke and flames couldn't hide. In his chest, buried up to the hilt, was our big carving knife. There was no doubt but what Dayton had plunged the blade in himself.

Of all those people there I alone realized why he had done it. For the blackened metal of a small oil heater lay beside him. In falling, after the knife was in his chest, he had overturned it, spilled oil out and set the carpet on fire. This had burned the house and destroyed the Cyclopytes. They could ward off destructive impulses aimed at themselves. But they hadn't been able to understand or stop the impulse of self-destruction for a humanitarian cause.

Perhaps the will to such great sacrifice is something that only humankind possesses. Dayton had deliberately outwitted them. He must have known that his falling body would overturn the heater. He had given his own life that others might live, that freedom might not perish from the earth. He had become immortal, not as he had first hoped, but as a great world patriot, benefactor and glorious hero of science.

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A BRAND-NEW FASCINATING FEATURE

IF you want to make mental whoopee, here's a vitamin-packed batch of scientific brain-teasers and cosmic conundrums. Our own Dr. Quiz claims you should be able to mastermind most of these problems without doing any encyclopedia juggling. But if its all a che-mystery to you, turn to page 114 for answers.

POSITIVE OR NEGATIVE?

The following statements are either true or false. Although some of them appear to be ridiculously simple, you'd better think twice before you answer. (Par.—15 correct.)

1. No single astronomical observation has yet been made which suggests that space is curved.
2. A few insects, such as the deer bot fly, can fly as fast as 800 miles an hour.
3. As far as we can tell, an animal which has just died is chemically identical with what it was when alive.
4. The discovery of genes confirmed Mendel's hypothesis of hereditary factors.
5. A man hit by an automobile going at eighty miles an hour, will probably feel nothing, because his brain is destroyed before any nervous impulses from his skin reach his brain.
6. Merak and Dubhe, two stars in Ursa Major or the Great Bear, are called the "pointer" stars because they point to the pole star.
7. There are two ice cubes in a glass filled with water. When the cubes melt, the water will overflow.
8. Hair continues to grow after death.
9. The stars are called "fixed stars" because, in contrast with the planets, they preserve the same relationship to one another during the brief periods of human history.
10. All sound waves travel with the same velocity in the same medium.
11. Although the volume of the sun is more than 60,000,000 times that of the moon, they both appear to the naked eye to be about the same size.
12. All bacteria are harmful.
13. Since the moon has neither atmosphere nor water, there is no erosion upon its surface.
14. Applied to ordinary particular cases, the difference between the gravitation laws of Newton and Einstein is almost negligible.
15. In the disintegration of an atom, both protons and electrons shoot away at the rate of 186,000 miles a second.
16. The stars are uniformly distributed in space.
17. The chief and almost only source from which the earth receives its energy is from the sun.
18. You are traveling in a car going 40 miles an hour. If you should suddenly turn on the headlights, the light will now be traveling at a velocity of 186,000 plus 40/3600 miles per second.
19. The great majority of mental defectives are physically distinguishable from normal persons.
20. One of the most amazing facts of astronomy is that all nebulae are receding from us.

TAKE A LETTER

Here are ten incomplete scientific facts. There are three or four suggestions that will enable you to complete each statement correctly. You'll be doing par if you get seven correct.

1. The Northern Lights are called Aurora Borealis. The lights at the Antarctic are called: (a) Aurora Australis, (b) Aurora Borealis, (c) Aurora Polaris, (d) there are no Antarctic Lights.
2. Romer's observations on the eclipses of

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the innermost of the satellites of Jupiter are important because: (a) it confirmed the hypothesis that the sun was the center of the Solar System, (b) it disproved the hypothesis that the velocity of light was infinite, (c) it was the first case on record of an eclipsing binary star.

3. If the newspapers announced that the Andromedids were coming you'd expect: (a) a visit from the inhabitants of Andromeda, (b) a meteoric shower, (c) a tropical hailstorm, (d) great activity of the sunspots.

4. A mechanical finger is: (a) the finger that sets a robot in motion, (b) a finger that involuntarily responds to a touch of the patellar nerve center, (c) the most important screw of the reflecting telescope, (d) a contrivance used to separate minute particles, for examination, from the mass of matter contained on a microscopic slide.

5. The distance between the freezing and boiling points of water on the Centigrade thermometer is 100 degrees. On the Fahrenheit thermometer it's: (a) 80 degrees, (b) 100 degrees, (c) 180 degrees, (d) 200 degrees.

6. A train is traveling north at the rate of 100 miles per hour. A bullet is fired at the same rate in the opposite direction from a gun on the train. The bullet will fall to the ground: (a) almost immediately, (b) in 7 seconds, (c) in 12 seconds, (d) in 25 seconds.

7. The germ theory refers to: (a) the presence of bacteria in polluted water, (b) the theory that all bacteria reproduce asexually, (c) to the theory that the origin or generation of living things can take place only through the agency of pre-existing living matter.

8. The recently discovered *Epsilon Aurigae* made newspaper headlines because: (a) it proves the ancient Greeks carried on commercial traffic with Atlantis, (b) it is believed to be the long sought after "missing link," (c) it clears up the unknown mathematical term in Einstein's relativity equation, (d) it is the largest known star ever discovered.

9. If you wanted to know the exact position of a planet anytime during the year you should consult: (a) an ephemeris, (b) a zygospore, (c) a schizophrenia, (d) a pericardium.

10. Heisenberg's "Principle of Uncertainty" states that: (a) we cannot be certain of the revolution of Venus because of the layer of clouds that surrounds it, (b) we cannot at the same time know with absolute accuracy the position and momentum of a particle, (c) two objects cannot occupy the same place at the same time.

THIS IS ELEMENT-ARY

Recently we read in the newspapers that a scientist changed gold to mercury. We can do even better and change gold to odgl by "transmuting" a few letters. Can you unravel the 15 elements below? With a little time and patience you should be able to get all 15—hence 15 is par for this question.

1. nzci
2. livers
3. noobr
4. oabctl
5. lkneci
6. imelhu
7. msuoid
8. prceop
9. rmbaiu
10. isinclo
11. uyrmecr
12. mmiueangs
13. mnnaaeesg
14. itlapmnu
15. pphhoossur

NUMBER SERIES

None of the following numbers when taken alone means anything. But when combined with other numbers, they take on a definite meaning. You may consider yourself a super-genius if you get all five of the following series correct, but you'll be hitting par if you correctly identify two.

1. 32, 64, 96, 128.
2. 85, 87.
3. 2, 8, 18, 32, 18, 8.
4. 4, 7, 10, 16, 28.
5. 0-20, 20-50, 50-70.

SCOPE SCOOPS

Of course you know what a microscope is, or what a telescope is used for. But how familiar are you with the following scientific "scope" gadgets? This is tough, so par is seven.

1—Electroscope.
2—Thermoscope.
3—Diaphanoscope.
4—Stereoscope.
5—Helioscope.
6—Hygroscope.
7—Fluoroscope.
8—Stethoscope.
9—Hydroscope.
10—Chronoscope.
11—Kaleidoscope.
12—Pyroscope.
13—Spectroscope.

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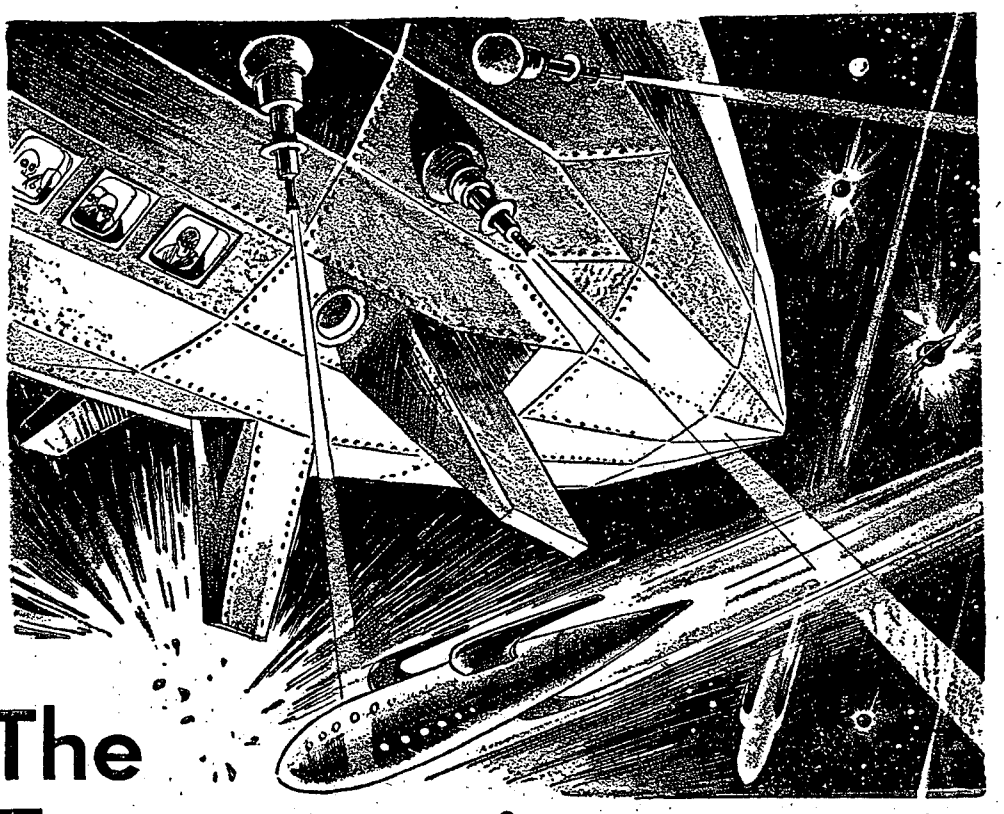

The Exterminators

Mysterious Marauders of Space, Brood of an Alien Universe, Blast Through the Cosmos to Hurl a Challenge at Civilized Forces!

By FREDERIC ARNOLD KUMMER, Jr

Author of "Candid Camera," "Death at Eight Bells," etc.

CHAPTER I

Spawn of Outer Space

THE *Kylos,* blasting her monotonous way through space in the direction of Io, seemed like a silent tomb. Steve Sheridan, stretched out on his narrow bunk in the after cabin, felt oppressed by the lack of noise, of apparent motion. Space-fever, they called it, that frantic nervousness born of cramped quarters, dreary uneventful days, and the vast changeless void of the Universe. He sat up, swung his feet over the edge of the bunk.

It had been a gruelling trip; even his companion, Nils Hansen, the stolid, blond giant from Mars, showed signs of strain. Foolish for two men to attempt a flight from Earth to Io in a light space yacht. Yet both were scientists and had decided on the trip as an adventure, an escape from the formality and dressy atmosphere of the big liners. Now the loneliness was beginning to tell upon them, for they only saw each other a few minutes each day, one always at the controls, one always resting.

Once he and Nils had brought the space yacht to Xenis, cold capital city

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A Complete Novelet of Interstellar Raiders

A pencil of purple lashed out from the green ship

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of Io, they would enjoy a week's riotous living among the spacemen's cafes along the landing port, followed by a week's hunting in the sub-zero stretches of the great Jehal plain. Then, and only then, with the space-fever blown from their minds, would they report to the new government laboratories at Xenis and continue their work on metallic alloys.

Steve Sheridan stared unseeingly at the rivet-studded bulkhead. Before his eyes passed visions of whiskey in endless rows of bottles, of the slender, deep-eyed girls of Xenis, of he and Nils, trekking across the frozen Jehal, warm in wool-lined space suits, their heat-guns ready in case of an encounter with the fierce, white-furred Ioian puffies. To be free of this metal cell and live!

"Steve! Steve, come here! Quick!" It was Nils Hansen's voice echoing down the long central corridor.

Automatically Steve Sheridan found himself running along the hallway, his head bent low to avoid the transverse supporting beams. Perhaps Nils feared a collision with an uncharted asteroid, or maybe one of the rocket-tubes had gone bad.

He pounded up the companionway steps, burst into the control room. Nils Hansen's huge figure stood rigidly in front of the audiovisor screen; his face was set in harsh, drawn lines.

"We're just opposite the space observatory on Jupiter," Nils exclaimed, without turning. "I thought I might be able to pick them up, say hello. Look!" He motioned toward the screen.

THE two foot square was dimly lighted, spotted with interference. On it was a man's face, a pale, tortured face, with eyes that reflected stark terror, sickening fear. Gasping, Sheridan recognized Dr. Ernst Flane, the noted terrestial physicist who had gone into voluntary exile on Jupiter with a small group of assistants, in order to study the cosmic rays. As Steve Sheridan stared, the thin lips moved, and a feeble voice whispered through the control room.

"Calling all space! All space! Any ships within broadcast range contact at once!"

Sheridan spun the power on full, adjusted his wave length control.

"Space yacht *Kylos* en route to Io!" he snapped. "Are we coming through, Dr. Flane?"

A look of relief passed over the anxious face in the screen.

"Thank God!" Dr. Flane murmured. "Listen! You must warn the Solar System! A space ship . . . tremendous size and radical design . . . appeared over our observatory last night. We endeavored to make friendly contact with them. From—from certain things I believe them to be inhuman, some spawn of outer space. They—they . . ." His voice trailed off weakly, and the eyes on the screen began to glaze.

"Yes?" Steve Sheridan cried. "Continue, Dr. Flane!"

The white face came to life once more; it was obvious that only by a superhuman effort of will power was Flane speaking now.

"New weapons . . . rays," he whispered. "They turned them on our observatory in answer to our friendly overtures. I escaped by . . . miracle, except for . . ." he broke off, raised his left hand into view.

"God!" Nils Hansen's voice was thick with horror as he stared at the limp hand on the screen The skin was unbroken, the nails, even the hair on it, undisturbed. But from the wrist down it was a flabby, pulplike mass, swaying idly as an empty glove!

"Just my hand," Flane croaked. "The others got it all over." He shuddered convulsively. "We were unarmed except for hand rays. No use against a ship. Now they're preparing to detroy the observatory itself. They are spraying the buildings with liquid oxygen. . . ."

The scientist's face twisted with pain.

"Warn Earth . . ." he moaned. Then abruptly he disappeared from view.

"Poor devil!" Nils said grimly, staring at the background of the observatory in the audiovisor.

Suddenly a crackling roar issued from the screen. They had a momentary glimpse of crumbling walls, fierce,

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brilliant flame. Then the audiovisor screen went blank.

"Transmitter destroyed," Steve Sheridan muttered, "along with the rest of the observatory."

Nils clutched the top of the T-bar, stared at the blank screen. "What did it? Even a twenty-six inch heat ray couldn't blast the observatory in ten seconds!"

"Didn't you hear him say they were spraying it with liquid oxygen? Jupiter's atmosphere is over ninety percent CH_4—methane. Shoot a spark through methane and it'll combine with oxygen, burn with a terrible heat. And once the observatory's oxygen supply was touched off. . . ." Steve snapped his fingers. "Finis!"

NILS HANSEN shuddered.

"The swine!" he grated. "Wait'll the Solar Fleet hears of this! We'll blast 'em to bits!"

"Maybe. And maybe not. I haven't forgotten Flane's hand. Any people who can cross outer space—which we haven't been able to do yet—must be pretty far advanced."

Silently Nils Hansen turned to the control panel, jerked the acceleration lever from "cruising" to "emergency." Steve Sheridan staggered back against the rear wall of the cabin as the little ship leaped forward.

"The *Kylos* can still move right along," he chuckled mirthlessly. "How long before we reach Io?"

Nils made a rapid calculation.

"Two days, if we hold this speed. There ought to be just enough fuel. You'd better stick at the audiovisor, watch out for other ships, warn them. No telling where or when this spawn

MEET FREDERIC ARNOLD KUMMER, JR.

WITH this story Frederic Arnold Kummer, Jr., already well known for his mystery and detective tales, many of which have appeared in our companion magazines, branches out into a new field.

The editors of THRILLING WONDER STORIES feel that he is an authentic discovery in science fiction. After you have read this story, THE EXTERMINATORS, we are certain that you will share our enthusiasm.

F. A. Kummer, Jr.

Born twenty-five years ago at Catonsville, a small town on the outskirts of Baltimore, Frederic Arnold Kummer, Jr., spent his childhood watching his famous novelist father tearing his hair and swearing at the typewriter! Young Kummer decided to shy away from writing—and when he graduated high school he took a job in the cashier's office of a life insurance company.

"After four years of clerking," Kummer says, "I was through with big business and yielded to the lure of the pen. Another writer was foisted upon an unsuspecting public. Tough at first—but the going is easier as practice increases, and last year I produced over forty successful yarns.

"My younger brother is a scientist and a member of the Maryland Academy of Sciences. My own interest in science has always been keen, although I have not specialized in that field.

"Incidentally, speaking from a reader's standpoint, I'm one of those fans who are rooting for a quarterly in addition to the regular T. W. S. It's a great magazine. . . ."

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of outer space will strike again."

THE *Kylos* hurtled like some gigantic projectile toward Xenis. Below, the straggling city sprawled haphazard over the barren Ioian plain. The rows of dome-shaped houses, insulated, hermetically sealed against the cold, rare air, seemed peaceful, homelike, after the long weeks in black space. Steve Sheridan could make out the white crystalloid roof of the administration building, gleaming faintly in the light of the distant sun. To the right lay the great space port with its blackened sand-pits, its enclosed drydocks. A dozen ships lay at mooring —sleek patrol craft, huge, unwieldy freighters, glittering liners, battered tramps, and trim yachts.

"Looks okay," Nils Hansen grunted.

"Then why wouldn't they answer our radio?" Steve Sheridan shook his head. "I don't like it."

Nils Hansen made no reply, circled the *Kylos* toward the landing field. Both men were gaunt, haggard from the strain of the past forty-eight hours. The persistent, ominous silence of their audiovisor had worried them, brought visions of Xenis destroyed like the observatory on Jupiter. Now with the town, familiar, intact, beneath, they felt more at ease.

Hansen watched the ground rush up to meet them; his eyes flicked toward the fuel gauge. The indicator registered empty, but there was fuel, he was not sure how much, in the pipes. Instead of coming in on the customary long slant, it was necessary to wait until the last moment before opening up the forward rockets. Nils Hansen set his teeth grimly, stood poised over the T-bar like one of his Viking forefathers at the helm of a galley. The sand-pits were barely a hundred feet away when he pulled back the lever.

From the bow of the space yacht a stream of flame burst forth, churning up the sand, fusing it into lumps. There was a jolting bump and the downward motion ceased. For a long sickening moment the ship stood on her nose, trembling. Steve Sheridan strapped in the navigator's seat, held his breath. If the *Kylos* fell back on her under side, the bottom exhaust rockets would allow her to settle gently. But if she fell forward, nosed over. . . .

For what seemed years the space yacht hung nose downward. Then, slowly she settled, right side up. With an explosive sigh of relief Nils Hansen cut in the bottom rocket tubes.

"Whew!" Steve unbuckled his safety strap, stood up. "Close! I thought. . . ."

He stopped short as the little ship gave a terrific lurch. Then everything went black. . . .

Steve Sheridan returned to consciousness slowly. As through a dim mist he saw Nils' face, pale and anxious, staring down at him. He struggled to one elbow, shook his throbbing head.

"What happened?" he gasped. "My head . . ."

"You bumped it on the gyro-regulator," Nils Hansen grinned. "The fuel gave out about six feet from ground. Running at top speed drained the tanks. I was all right, strapped in my seat. But talk about your close figuring! If this had happened five minutes ago we'd be grease spots!"

Steve Sheridan stood up, glanced out of a porthole. The field about them was deserted. The rare atmosphere more than made up for the faintness of the sun's light, and he could clearly make out the buildings, the workshops. About all of them, however, hung a dead stillness, a lack of life that was somehow terrifying.

"Funny." Nils Hansen joined him at the window. "No ground crew or customs' inspectors to meet us. They must have seen us land."

"If there are any alive to see," Steve Sheridan muttered grimly. "Let's find out."

NILS HANSEN jerked open the space suit lockers, clothed his vast frame in a clumsy asbestos outfit. Steve did likewise, wincing as the sub-aluminum helmet pressed against the bump on his forehead. The preliminary tests, inflating the suits for possible leaks, adjusting the tiny microwave sets for communication through

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the sound-proof helmets, were satisfactory.

"Okay," Steve Sheridan snapped. "Let's go!"

Nils Hansen buckled on his heat ray gun, spun open the airlock, and stepped cautiously to the ground. It was a bright Ioian morning; along the edges of the landing field beds of the bizarre native flowers waved their bulbous fungoid pods; the wan sunlight threw sharp shadows across the hard, rocky ground.

"Ship's all right, anyhow," Sheridan pointed to the bottom rocket tubes, buried in the sand pit but apparently intact. "And nothing's happened to us, so far."

He gazed about the deserted port, usually teeming with activity, and strove to shake off the feeling of impending disaster which oppressed him. "How about taking a look at the administration building?"

The great white tower stood silent, tomblike, its metal doors closed. Nils threw his weight against them, turned away, frowning.

"Locked!" he exclaimed. "Try your gun."

Sheridan leveled his flame projector at the lock, watched the heavy steel melt under the vicious red ray.

"Okay." Hansen kicked the glowing door open, stepped into the airlock. Rows of space-suits hung on hooks, in the manner of a cloakroom on earth. The inner door was also closed, but yielded to a spurt from the heat ray.

"So far, so good," Hansen muttered. "Now . . . He broke off with a gasp of horror, staring at the crumpled figure behind the information desk.

It was, or had been, a man. It lay back in the chair now, a flabby, wellnigh shapeless mass. The skin hung in sagging wrinkles over a horrible, distorted face. Looking at it, Sheridan was reminded of a rag doll, limp and jellylike.

"The same as Flane's hand!" Hansen choked. "*They've* been here! Struck without warning!"

Sheridan nodded. With an effort he approached the dead man, lifted his arm. It felt like a thick, rather loosely-packed sausage. When he dropped it back upon the desk, the arm flattened out.

"No bone!" Steve Sheridan announced. "Look!" He pushed his forefinger against the man's forehead; it gave like a soft pillow.

Hansen's face, behind the glass front of his helmet, was a horrified mask.

"A ray. Bone, you know, is mostly $Ca_3(PO_4)_2$—calcium phosphate. The effect of the ray seems to be separating calcium phosphate to its original constituents." Sheridan pointed to a lamp on the desk, glowing feebly in the light of day. "They struck at night. The length of day here differs from that on earth, naturally, so people work their regular hours regardless of whether it's day or night. I'd say the ship of the invaders drifted over at night, swept the city with their rays."

"Devils!" Nils Hansen growled. "It's extermination, then! And after man is wiped out, I suppose they'll take over the Solar System!"

"Not if we can help it!" Sheridan ran toward the elevator. "Radio room should be in the tower. Come on!"

CHAPTER II

Death Ray

THE radio room was a weird jumble of vast machines. Tubes as tall as a man, gigantic rheostats, wires, insulators, and great panels covered with dials and switches. The Interplanetary Communications Bureau was the pride of the Solar System; through it, news could travel from tiny Mercury to distant Neptune in an incredibly short time, relayed from planet to planet, from satellite to satellite. It had been developed during man's relentless push from Earth to the far reaches of space, and held the wide-spread colonies together by its invisible waves. The station on Io was a new one, superpowered and comparable to the big centers on Mars and Earth.

The audiovisor screen was blank as Hansen and Steve Sheridan entered, although a flashing red emergency bulb indicated that space sought com-

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munication, sought to learn the reason for Xenis' silence. Nils toppled the boneless, flabby figure of the operator from his chair before the control panel, spun the dials in delicate adjustment. A man's face, heavy and stolid, appeared on the screen.

"Mars calling Io! Calling Io! Other stations relay!"

Steve Sheridan lit a match to test the radio room for air, then swung back his space helmet.

"Io answering," he said, leaning forward, tense-faced. "All stations relay to Mars! Are we coming through, Mars?"

The heavy-set man continued to call Io. For an instant Sheridan frowned, believing that his message was blanketed.

Then he heard his own words repeated, echolike, saw the operator at Mars straighten up. Even super-frequency waves required some time to traverse the vast distance.

"Proceed Io," the Mars operator snapped.

"Space raiders, believed to be from another universe, have destroyed observatory on Jupiter, blotted out all life in Xenis, using unknown ray causing breakdown of calcium phosphate, resulting in death. Warn Earth and all colonies."

Sheridan waited until his words were repeated.

The operator's head snapped up; his face was no longer stolid.

"Check!" he barked. "Any further information, Io?"

Steve Sheridan shook his head.

"None available. Except that invaders seem bent on destroying all human life. I, Stephen Sheridan, and my companion, Nils Hansen, arrived here after massacre. We're the only people alive on Xenis, as far as we know. Will report further developments as they occur. That is all."

Sheridan ran a hand through his coppery hair, gave a sigh of relief.

"Well, they're warned, anyhow, thank God," he muttered. "Now what?"

A slow grin spread over Nils Hansen's broad face.

"Let's eat," he suggested.

"WE'RE about as safe here as anywhere in the Solar System," Hansen mumbled, his mouth full of beef. "Long as the enemy thinks they've wiped out Io completely, they probably won't return here for awhile. May start work on Ganymede or one of the other satellites."

"And then the rest of the planets, one by one," Sheridan said grimly. "While we sit here and wait for them to come back and take over the colony."

"They're only run up against defenseless planetary outposts, so far. Struck 'em down before they had a chance to defend themselves. Wait'll they try to crack the forts on Saturn and Uranus and Neptune. And the Solar Fleet ought to be out here in a month." Hansen glanced about the well-stocked lunchroom. "Meanwhile we've got plenty of food, and the government laboratories to play with. Maybe we can work out a defense for that calcium destroyer. . . ."

He stopped short, listening. Through the corridors of the building, distant, yet quite clear, sounded footseps . . . heavy, metallic footsteps! Nils jerked his heat gun from its holster, moved toward the door. Steve did likewise, his lean, muscular body poised for action. The footsteps drew closer, echoing ominously through the empty hallway. At the door of the lunchroom they stopped. Both men crouched low as they saw the knob turn. A slight, space-suited figure stood in the doorway.

The mad, instinctive rush of the two Earthmen bore the figure to the floor, where, stunned by the fall, it lay still.

"Great Cosmos!" Hansen muttered. "It's a girl!"

Sheridan stared down at the inert figure. Through its glass-fronted helmet he could see a pale, delicate face, fringed by soft, dark hair, slashed by a vivid red mouth.

"Here! Let's get her up!" Together they lifted her to a table, pushed back her helmet.

The girl twisted her head, opened her eyes. At sight of the two men bending over her, she gave a relieved sigh, sat up.

"Thought you were—the beings from

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space," she murmured. "I—I'm all right, now. Just had the wind knocked out of me."

"Sorry." Sheridan grinned. "We thought *you* were one of 'em. How did you escape?"

"By running away."

"Running away?" Hansen echoed. "From a ray? Impossible!"

"Not from a ray." The girl laughed, shook back her black curls. "From an uncle. I'm an orphan. My uncle kept a spaceman's cafe here in Xenis, worked me to death in the kitchen. So I decided to run away, find a job in Polis."

"Polis!" Sheridan gasped. "Why that's on the other side of the Jehal! You didn't cross that icy desert on foot, did you?"

The girl nodded.

Sheridan whistled admiringly. "Why you didn't get lost, or chewed up by puffies—"

"I know something about trekking," the girl said quietly. "I've lived on Io since I was six. Anyway, I reached Polis and found it—wiped out." For a moment her self-composure broke. "Horrible! Flabby, wrinkled corpses . . ." She shuddered. "I stocked up on food and oxygen, started back here to Xenis. I guess the invaders didn't think it necessary to sweep the Jehal. So I returned safely, and found everyone dead except you two."

"We got here after the massacre," Steve Sheridan explained. "Did you see their ship?"

THE girl nodded once more.

"It was hovering over Polis as I drew near. A strange looking thing. All angles and squares, no two of them alike. A geometrician's nightmare. Made out of a green, luminous substance, new to me. It was bigger than a dozen of our largest ships. I could see their purple rays playing on Polis, and stayed out in the desert until the ship left toward Xenis."

Steve Sheridan straightened up.

"If you got away," he said slowly, "then there ought to be trappers and hunters alive in the Jehal."

"No." She shook her head. "It's not the trapping season. And anyone else traveling would have used rocket-cars, been seen."

Nils Hansen thrust his hand into the pocket of his space-suit, jingled the odds and ends which spacemen always carry.

"I'm Nils Hansen, and this is Steve Sheridan," he announced. "What's your name?"

"Stella Morgan," she grinned. "And you can just forget the Morgan part of it. No need for formality among the last three survivors on Io."

"Good!" Sheridan turned to Nils Hansen. "We might as well go over to the laboratory, see what we can do about that calcium destroyer." He smiled at the girl. "And as for you, Stella, stay in the radio room and keep us posted."

CHAPTER III

Circle of Doom

THE next month was a nightmare to the three refugees on Io. Sheridan and Hansen worked like madmen in the great government laboratories, snatching only occasional hours for sleep and rest. In spite of their efforts, however, results were not forthcoming. Dissection of bodies, preserved by the intense cold, revealed only that calcium phosphate had been broken down molecularly. Beyond that they could discover nothing.

To Stella fell an even more heart-breaking task. Except for the preparation of meals, she spent all her time in the radio control room. Day after day, hour after hour, she listened to the reports of man's failure against the Exterminators, as the invaders had come to be called.

Neptune, Saturn, Uranus, and Io's sister satellites, had all been wiped clean of mankind. Teeming colonial cities, rivaling those of the inner planets, had been blotted out in a few hours. Mighty fortresses, supposedly impregnable, were turned into vast mausoleums.

Space ships, patrol cruisers, freighters, and great space liners had been

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swept of human life and allowed to drift on through space, carrying their cargoes of dead out into the void. Scientists on Earth had made no more progress than Nils and Steve against the deadly purple ray; it appeared to pass with equal ease through mineral, vegetable, or animal matter.

Attempts at negotiation with the Exterminators met with stony silence. Ambassadors from New Baltimore on Saturn were destroyed as they came to sue for peace. Grimly, coldly, the beings aboard the strange space ship went about their work of annihilation. No one yet had seen them, knew from whence they came; countless wild stories as to their origin were circulated among the panic-stricken inhabitants of the inner planets.

In spite of the terror and chaos, one hope remained. This was the Solar Fleet, based, except for a few light patrol ships, on Venus, Mars and Earth. Great dreadnaughts, mounting twenty-six inch ray projectors, armored and insulated like fortresses, yet faster than the swiftest liner. Fifty of these, and hundreds of sleek cruisers, of bulletlike destroyers.

The crew of this great fleet knew what they were facing, knew that if a tenth of them escaped death, it would be a miracle. And if they failed, mankind was doomed.

All this and more Stella heard over the Interplanetary Communications system. Each day she had only discouraging news to pass on to Nils Hansen and Steve Sheridan, and sought to allay it by reports of the Fleet's progress toward the outer planets.

The two men would nod gravely, and hurry back to the laboratories to continue their work. All three of them were together only a few minutes each day, but as the weeks passed Sheridan began to realize that Stella's cheerful smile, her brave attitude in the face of impending disaster, were beginning to find a place in his heart. Nils Hansen, too, seemed to have fallen under her spell, but with characteristic impassiveness made no disclosure of his feelings.

THE daily routine of the little group was rarely varied. Hansen and Sheridan took a day off to refuel the *Kylos* from the supply tanks, and put her in instant readiness for flight should the Exterminators return to Xenis. Occasionally they were forced to go into the silent city, for supplies or equipment. These visits, however, were made only when absolutely necessary, since the heartrending scenes of destruction were frightful, depressing. Life on lonely Io moved slowly, an odyssey of tireless work.

The blow came with startling suddenness. Stella, keeping her solitary vigil in the radio room, was in communication with an advance scout of the Solar Fleet when she heard a vague humming above. Believing it to be a loose aerial terminal, she fastened her space helmet into place, stepped out onto the emergency balcony which circled the radio tower. As she did so, she felt her knees go weak. Drifting majestically overhead was the weird craft of the Exterminators!

For a moment Stella could make no movement. Horror-stricken, she remained rooted to the spot, her eyes fixed on the invading ship. Like a huge emerald cut by some mad lapidary it drifted across the sky, glowing with green luminosity, evil, malignant.

Stella took a deep breath, ran inside.

"Calling Solar Fleet!" she cried. "Io calling Solar Fleet!"

The blue-uniformed operator aboard the advance scout grinned on the screen.

"Hello, beautiful," he said. "You look excited."

"The Exterminators!" Stella whispered through dry lips. "Over Xenis! Come at once!"

The operator's face went hard.

"Okay, Xenis!" he snapped. "Hang on! We can make it in an hour!"

Stella turned from the audiovisor, sprang into the elevator. Down to the main floor, across the plaza. Half-way to the laboratory buildings she met Steve Sheridan and Nils running toward her.

"They've come" she gasped. "The Exterminators!"

"I know." Steve Sheridan nodded. "We saw them . . . were on our way to warn you. They must have heard

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our radio, come back to finish the job."

She turned, faced him bravely.

"What do you think we'd better do?"

"How about the *Kylos?*" Nils suggested.

"Just make a better target," Steve Sheridan said. "If we can get to the Jehal. . . ."

As he spoke, a purple cone broke from the bottom of the green ship, terminating in a circle that surrounded the entire city.

"No chance now," Nils Hansen rumbled deep in his throat. "If I could only get close to them!" He clenched his great fists helplessly.

"Perhaps they mean to take us prisoner," Stella said. "We—" She broke off abruptly as the unbroken circle of rays began slowly, inexorably contracting!

"Very efficient!" Steve Sheridan laughed bitterly. "The hollow cone prevents escape by ground or air. Then they contract it to wipe out all life! A lesson in extermination!"

WITH a species of macabre fascination they watched the purple ring grow smaller and smaller. Before half an hour had passed, only the space port, the laboratories, and the administration building were within the circle.

"Thorough, cold, emotionless," Nils Hansen muttered. "Remember what Flane said? 'Like humans stepping on an ant hill!'"

Steve Sheridan, who had been observing the relentless progress of the ray, seized Stella's arm.

"The radio tower!" he cried. "It's the absolute centre of the circle! Come on! It'll be the last place touched!"

With desperate haste they ran toward the administration building, directly beneath the green ship. In the radio room, Nils attempted to contact the Solar Fleet. His efforts were fruitless; the purple ray blanketed all radio communication. The circle, with a smaller radius, was contracting faster now. There was an area of only a hundred feet about the tower. Steve Sheridan felt a curious ache, a terrible weakness, spread through his body.

"So long, Nils," he choked. "And, Stella, there's a lot I'd hoped to tell you someday. Doesn't matter now. . . ."

Nils, listening, bit his lip, glanced fixedly at Stella. The purple ring had now reached the edges of the control room. Instinctively Steve tried to reach the exact center of the floor. To his horror he saw his legs bend beneath his weight, like soft wire. Then he and the others were lying inert on the floor, racked with excruciating pain, waiting for the end.

Steve Sheridan's vision began to blur. The purple circle was a scant six feet from him. All his strength was gone, and his body seemed pierced by a thousand drills. Suddenly everything went black. . . .

CHAPTER IV

The Invaders

CONSCIOUSNESS filtered slowly into Sheridan's mind. Stella's voice seemed to be calling to him from the end of time. With an effort he opened his eyes, saw her kneeling over him.

"Steve! Steve, darling!" she whispered. "Are you all right?"

Cautiously he pressed his thumb and forefinger together. Through the heavy fabric of his space suit the bones felt hard, firm. Steve struggled to his feet.

"What happened?" he muttered.

Nils Hansen, who had been watching him narrowly, spoke.

"They cut off the ray. You were nearest the edge of the circle, got it worst. Another minute and the calcium would have been completely broken down." He turned abruptly, opened the door to the balcony. "Maybe . . . It is! It's the Fleet!"

Aided by Stella, Sheridan walked slowly to the balcony. Outlined against the pale sky was a cluster of tiny black dots, growing larger each second. The green, many-angled ship of the Exterminators was rising to meet them. More of the black specks appeared, and yet more. Like mosquitoes clustering about a man's head,

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they crowded in from every side, nearly hiding the invaders.

Suddenly, as at one command, a thousand heat rays, large and small, focused upon the enemy ship. A lurid glare lit up the sky; warmth from the rays could be felt by the three onlookers miles below. Nils Hansen grinned. No space craft could withstand that heat! In an instant it would glow, crumble. Life must have already been snuffed out. . . .

All at once a pencil of purple lashed out from the green ship, and a great Solar dreadnaught dove out of control, to crash on the frozen surface of Io.

"They can't!" Steve Sheridan muttered. "All those heat guns on them! Their ship must have been ten thousand degrees! How *can* they be alive?" He gripped the railing, fiercely. "The last hope gone! It's the end of mankind!"

Still the batteries of heat projectors played on the Exterminators. Contemptuous, they swept their purple ray from ship to ship of the Fleet, sending each reeling off into space with its cargo of already dead men. The sky was filled with diving, falling ships. And still the Solar Fleet fought on, seeking to ram the Exterminators now that their rays had proven useless.

It was appallingly brave—and appallingly futile. As they headed for the green ship, a beam of purple would stab at them and, all life wiped out, they would crash, out of control. Steve Sheridan shuddered as the pitiful remains of the once-mighty fleet locked their controls and plunged toward the enemy in mass suicide.

The calcium rays lashed out, annihilating their crews. Controls fixed, however, they raced onward, glittering empty shells, converging on the enemy. Steve's heart leaped with hope. The Exterminators, however, were prepared for this move. With a quick maneuvre they slipped between the diving ships, which, lifeless, were unable to change their courses. They met at the spot where the green ship had been, disappeared in a terrific explosion.

"The end," Stella whispered. "So brave . . ."

NILS HANSEN spun around, white-faced.

"There must be something humanity can do," he grated. "Must be! Radio-controlled projectiles—"

"The purple ray blankets radio," Steve Sheridan said sombrely. "And old-fashioned cannon haven't sufficient range. Unless we can develop a defense for the calcium projectors, or analyze that green metal—"

"It sheds heat like a duck sheds water," Nils glanced toward the control room. "Shall I let Earth know what's happened?"

"No!" Stella laid a hand upon his arm. "Please don't. Leave them their hopes a while longer. They'll find out soon enough." She looked up at the green ship, choked back a scream. "They're landing here!"

Above them the peculiar space ship was growing larger as it dove toward Xenis.

"The Jehal!" Hansen exclaimed. "Hurry! We'll be safe there, for a while, anyhow!"

Their flight was like a feverish nightmare. Weakened from the effects of the purple ray, weighed down by the heavy space suits, they staggered through the silent streets, toward the plain. Over their heads the great ship loomed larger and larger as it circled toward the landing field.

The three terrestrial survivors reached the outskirts of Xenis in safety. Here, with the white frozen surface of the Jehal stretching interminably before them, they slowed down to the long easy stride of the trappers and hunters who make the great plain their home. Sheridan, having some difficulty in matching Nils Hansen seemingly tireless pace, could not help but admire the endurance, the courage of Stella. Her lithe body appeared a reservoir of energy; no word of complaint, of objection, passed her lips. Like three ungainly robots they marched along, little plumes of condensed moisture streaming from the valves of their helmets, their baggy space suits flapping loosely as they walked.

Xenis lay some five miles behind when the rocket-car appeared. With-

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out warning it hurtled down out of the sky and landed on the plain before them.

The green metal and angular shape of the little car stamped it as one belonging to the Exterminators.

The three earthlings knew now that escape was cut off. They stood quietly, unimpressed, as people who have lived long under the shadow of death; terror had given way to a dull, fatalistic lethargy, a feeling that they had only met the inevitable. Nils and Steve stood waiting, heat guns in hand, although they well knew the futility of such puny weapons against these invaders.

Suddenly the door of the rocket-car opened and a metal-clad figure stepped out.

At sight of the Exterminator Steve Sheridan's senses reeled. Never in his wildest imaginings had he conceived of anything so utterly fantastic. The being was a jumble of angles, of squares, of weird geometrical designs, yet vaguely suggesting human form. It was a cubist drawing of the Twentieth Century come to life, remotely human, incredibly alien.

Even as Nature in the Solar system works in curves, with cylindrical trees, spherical fruit and berries, rounded human bodies, so these beings were a product of some rigid, mechanical Universe where Nature worked in straight lines!

Stella, clutching tightly at Sheridan's arm was unable to repress a shudder.

As the creature moved toward them, Sheridan raised his gun. As he did so he was aware of a terrible will beating into his consciousness, an inexorable will, unwavering in its intensity. And try as he might, Steve Sheridan was unable to pull the trigger!

Raging, he dropped the gun, leaped forward. Once again the wave of thoughts took control of his mind. An irrepressible craving for sleep overwhelmed him; his head fell forward, his eyelids drooped. He caught a momentary glimpse of Hansen and Stella slumping to the ground.

Then a deep unconsciousness claimed him.

CHAPTER V

To Save Humanity

"AWAKE, Earthlings!" The thoughts pounded through Steve's brain like the insistent ringing of an alarm clock.

He opened his eyes, sat up. The room, which he recognized as the main laboratory at Xenis, was crowded with sharp-angled Exterminators, wearing armor of the shining green metal. Hundreds upon hundreds of them, emotionless, inhuman, more like baroque robots than living entities. The room was ominously silent, Sheridan realized; all communication must have been solely thought transference. Nils Hansen and Stella, lying beside him, were stirring sleepily.

"Awake!" The thoughts came from a brilliantly dressed Exterminator who wore, as a symbol of authority, a glittering triangle bound to his square forehead. "Zel, lord of Thorth, commands!" He leaned back in his upright chair, toyed with the hilt of a ray-gun at his belt. Sheridan could hear his fingers click as they touched the gun, and realized that the outer skin of these people was hard, like the fingernails of human beings!

Steve Sheridan climbed to his feet, gazed around at the rows of grotesque, outlandish figures.

"Who are you?" he cried. "And why are you destroying the race of man?"

Zel blinked his diamond-shaped eyes.

"We are the people of Thorth, from the outer reaches of space," his thoughts answered. "This group of planets suits our needs. Therefore we shall destroy you, an inferior race, even as you destroy the lower forms of life on your worlds for your own good. Your vague, formless bodies are weak; your minds, which I have examined while you slept, are primitive. We shall supplant you. I have taken you three alive, for study and examination. After we obtain information concerning your mental processes and habits, we shall dissect you."

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Stella swayed, sank to her knees with a piteous cry.

"Haven't you any pity?" she cried. "Can't you leave us alone, find some other, uninhabited system?"

Zel's thoughts were calm, inexorable.

"Emotion is primitive," he replied. "Scientific purity admits no weaknesses. That is all."

With a jerky motion of his arm, he waved them away. Two Exterminators, ray-guns in hand, stepped forward, herded the three humans down corridors toward the cellars of the laboratory. They had been stripped of their space suits, but the compression pumps of the building were still working, making the air dense enough to breathe. The Exterminators, apparently, were indifferent to either thin or heavy air.

Downward they went, twisting, turning, among the network of corridors that led to the supply rooms, the secret laboratories, the vast halls filled with power plants for heating and pumping air.

At last their guards paused before a small, brick-lined room which Steve recognized as one previously used for the storing of dangerous explosives. The door was made of reinforced steel, with one small grating to admit light and air. At a command from their guards the three earthlings entered the room. A moment later the door clanged shut.

NILS HANSEN glanced about their prison.

"No chance of escaping from here," he muttered. "Solid steel, solid brick. To be studied like guinea pigs—then the dissection table!"

Stella shuddered.

"Even the purple ray might have been better," she whispered.

"Try and forget it." Sheridan slipped an arm about her shoulders. "We need rest, eh, Nils?"

Nils Hansen shook his big blond head.

"You two sleep. I've got some things I want to work out." He propped himself against the wall, head in his hands, thinking deeply. Steve watched him a moment, then stretched out beside Stella, exhausted by the experiences of the past twenty-four hours.

A rattle of the door awakened him. To his surprise he found himself and Stella both lying behind the opening door. Hansen, it seemed, had moved them while they slept. Now the big Norseman was crouched in the middle of the cell, muscles tense, poised to spring. The door opened wide.

A square-faced Exterminator stepped into the room, carrying a tray of food. Before Steve was fully aware of what had occurred, Nils Hansen leaped forward, catching the guard about the waist. The tray crashed to the ground with a clatter, and the Exterminator swayed unsteadily on the threshold.

For an instant the two men struggled, Nils' vast strength almost equalling that of the space-raider. Steve scrambled to his feet, was about to come to his comrade's assistance when a flash of purple burst from the guard's pistol. The nearness of it sent Sheridan, rubber-legged, to the floor. Sick with horror he watched Nils Hansen slump, a jelly-like mass of flesh and skin, upon the damp bricks.

"A lesson in obedience to you others," the guard's thoughts flashed coldly, as he closed the door.

Sheridan and Stella dragged themselves to the limp figure. Nils Hansen was still alive, choking as his chest, unsupported by ribs, caved in.

"Calcium in lime between bricks," he breathed through flacid lips. "Ray made hole . . . thought it would work if I jumped him. Tore buckle from uniform . . . green metal . . . escape . . . analyze . . ." His voice trailed off into nothingness. Then, with a tremendous effort, he spoke once more. "Good-bye, Stella . . . loved you . . . knew Sheridan was your choice . . . be happy together . . ."

The girl sobbed, her hand upon the flabby forehead. Steve gazed down at the distorted remains of his friend, stunned into silence.

"Brave," he muttered at last. "Gave his life for humanity, for us. A chance for mankind, but it's up to us, now!"

Stella glanced up, puzzled. "I don't

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understand."

Steve walked to the rear wall of the storeroom.

"Look!" he said, pointing.

For a space of about four feet square the bricks sagged without support. The mortar between them had disappeared.

"Mortar is made mostly out of lime," he said quietly. "And lime is largely composed of calcium. Nils attacked that guard hoping he would be rayed, since it would enable us to escape."

"But why wasn't the mortar destroyed when the city was first exposed to the purple ray?"

"Because the ray is specifically for the breakdown of calcium phosphate—human bone. But at such short range even other calcium compounds cannot stand up under it." He bent, opened the dead man's limp fingers. Clenched in them was a queerly-shaped buckle of the green, heat-resisting metal, which Nils had wrenched from the guard's tunic during the struggle.

"Thanks to Nils Hansen the Solar system has a chance now. If we can get away, analyze this bit of metal, we may find some way to destroy their space ship."

"We'll have to!" Stella whispered. "For Nils!"

STEVE SHERIDAN nodded gravely, turned to the rear wall. Working swiftly and as silently as possible, he removed the loose brick, piled them upon the floor. Behind them was another wall of brick, also uncemented. Steve bent, peered through the cracks. Great dynamos, vast machines, in a dimly-lit room.

"One of the power plants," he whispered. "The humming of the motors will cover any noise we make!"

They raced along the corridor, heedless of possible guards, until Steve Sheridan spied an emergency airlock at the end of one of the cross-passages.

"No guard," he said exultantly. "But it'll be tough, anyhow. Fifty below out there, though we won't mind the cold so much, running. The worst part will be the lack of air. If they hadn't taken our space suits . . ."

"How far is the *Kylos?*" Stella asked.

"Can't tell. If I'm correct, this passage ought to come out near the hangars. Want to try it?"

THE girl nodded, took a deep breath. Then they were running across the frozen ground, hearts pounding, lungs straining. The dim bulk of the *Kylos* loomed some two hundred yards away, near the edge of the landing field.

Steven Sheridan felt a vast sense of relief as they boarded the trim little space yacht. Leaving Stella at the heat guns, he ran along the companionway toward the control room. A quick jerk of the main switch, a twist of the T-bar, and the ship shot skyward with numbing velocity.

Free! A chance to save earth! He opened the rockets to their limit, watched Xenis dwindle to tiny size below them. And then, all at once, he experienced a strange desire to return. Back . . . he had to go back to Xenis. . . . Had to. . . .

Footsteps sounded on the iron stairs of the control room.

"Turn around," Stella said thickly. "We've got to hurry back. . . ."

Sheridan nodded, reached for the T-bar. As he did so, a flash of clear thought snapped through his brain. The Exterminators, using their telepathic will control, were commanding his mind! With a quick, instinctive gesture he bent, tore away the mass of wires that led to the directional blasts.

"No!" Stella said. "You—you can't. . . ."

"Will power!" Sheridan muttered. "Almost got us! If I hadn't ripped those wires. . . ."

He stopped short, his eyes fixed on the heavy glass observation window. Moving slowly across the sky several miles to his right was a purple streak! The Exterminators, unable to capture them alive, were now trying for their death! And with the controls frozen it was impossible to dodge, to zig-zag!

Sheridan lunged forward, pulled the main switch, cutting off all rockets.

"Now they won't be able to spot us by the exhaust flames," he said.

"But," Stella stared at him queerly,

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"we'll fall back!"

"Right." He nodded. "But not to Xenis. Watch."

Stella stared below. The little space yacht, deprived of all propulsion, was falling, pulled back by the gravity of Io. In their flight, however, they had not gone straight up, but rather on a long slant. Now, on descending, the curvature of the satellite hid them from Xenis.

"You see?" He pointed downward. "The Sulphur Sea is directly below us. That means we've got all of Io between us and Xenis. We'll keep it between us until we're a million miles out in space. And from the way our rockets shut off, they'll think they rayed us." He grinned, snapped on the power blasts. "Next stop Earth!"

"But will we reach it before the Exterminators do?"

"I'm sure we will. They've all the scattered asteriod colonies to wipe out yet. And Mars. That'll take them at least three months. We'll reach Earth in less than one. Which will give us between two and three months work in the laboratories before they strike Earth."

He patted the little green buckle in his pocket. "Meanwhile, no matter what happens afterward, we'll have the next month together, you and I."

With one hand upon the T-bar he slipped the other about Stella's waist, drew her down to him, kissed her.

CHAPTER VI

The End of the World

AS Sheridan settled the *Kylos* in the Washington, D. C., spaceport, he realized at once that the news of the Solar Fleet's disaster must have reached Earth. The field was deserted, showed obvious signs of neglect, of vandalism. Tools scattered, hangars left open, windows smashed. With a shake of his head he stepped to the ground, helped Stella descend.

At the edge of the field they got their first hint of the chaos which had descended upon Earth. A half-starved, dirty figure, reeling drunkenly, stepped from a doorway, seized Stella's arm.

"Come on, baby," he hiccoughed. "Enjoy yourself while you can. End of the world's coming."

Sheridan sent the man sprawling with a quick blow.

As they passed further into the city, the degeneration of humanity became even more apparent. Wild-eyed throngs packed the streets, giving way openly to the maddest excesses, running the gamut of vice. No one worked, and food was at a premium. Rotting corpses, dead by violence, lay unburied on the sidewalks.

Steve Sheridan and Stella, forcing their way through the maddened throngs, were sick with horror and disgust. Slipping unobstrusively from doorway to doorway they managed to reach the Government Circle, a large enclosure encompassing the Solar Fleet laboratories, the Department of War, the Houses of Congress and the White House.

Instituted during the Martian revolts to keep out spies, the Government Circle was automatically separated from the rest of the city during any crisis. The Circle was guarded by stern-faced Marines, and only those people who remained level-headed and determined were allowed to enter.

After some difficulty they were admitted. They went at once to the Chemical Warfare Building. Here Sheridan's story, corroborated by the luminous green buckle, created a furor of excitement and a wave of hope. Scientists, who had given up their efforts in despair, now offered their services in the analysis of the strange metal; the President, utilizing what little power he had left, threw all government agencies into the work.

Six weeks of toil passed without results; the green metal was discovered to have an atomic weight of 95.03 and was believed to be the hitherto undiscovered element 43 on the scale between Ruthenium and Molybdenum. Beyond that, nothing. Exposure to every type of heat ray, every electrical discharge, had no effect upon it. It seemed invulnerable.

Meanwhile fragmentary reports

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from space indicated that the Exterminators had desolated the asteroids—or Rich Man's Space, as it was commonly called, since almost all of the little worlds were privately owned — and were nearing Mars. Already such space ships as were still operating had left for Venus and Mercury, as these apparently would be the last attacked.

Steve Sheridan was bent over his desk, pale and haggard, when Stella brought him the news of the destruction of Mars. It was the old story, the triumph of the purple ray and the imperviousness of the green metal. A familiar story on Earth, now, but it had a telling effect upon Steve Sheridan. He slumped down in his chair in sudden despair.

"No use," he muttered. "None of our weapons can penetrate it. The metal is soft enough against a blow of any sort, but the ship stays out of range of old-fashioned projectiles. Space cruisers are no use, radio-controlled ships are blanketed. Heat rays, electrical discharges, ineffective. I'm ready to chuck it all and live a few happy weeks with you before the end."

Stella's hands gripped the back of his chair, tightly. It was a temptation to her as well. Why not let Steve give up the hopeless struggle, snatch a few weeks' happiness for them both? And then suddenly she found herself thinking of Nils Hansen . . . Nils who had loved her in his quiet way . . . Nils who had given his life to mankind. For Nils' sake. . . .

"Don't give up, Steve," she murmured. "The Solar System needs you. Keep at it and maybe—"

"No," he said. "It's madness. Nothing affects number 43. No weapon—"

"But if you can't destroy it, isn't there some way of—well, changing it?"

"Changing it?" he repeated in an awed voice. "Stella! I—I believe you've hit it! Hey, Smith! Macklin!" He ran into the adjoining laboratory, snapped orders at his assistants.

THREE weeks later the green, many-angled space ship was sighted above Tokyo. Within two days all of Japan and the coastal provinces of China were lifeless. Slowly, inexorably, it swept westward, wiping out mankind. Flight from the deadly rays was well-nigh impossible. Russia, India, Australia were suddenly devoid of all life.

During this havoc and destruction, a vast machine was slowly taking shape in the Government Circle at Washington. A strange machine, a mass of tubes, of wires, of projectors. Under Steve's tireless supervision the hordes of workmen toiled.

At one end of the machine was a large tube, thrusting skyward, and screened with several feet of nickel, slightly mixed with lead. Great grids of Yttrium, liquid oxygen sprays, sleeves of invar, similar to those used in Cathode-ray tubes, and banks of smaller tubes containing vaporized helium. Men were dwarfed by the huge mass of metal and glass; it towered some four hundred feet into the air.

The last preparations of the Sheridan Convertor were completed on March 18, 2741. Outside the Government Circle the bulk of the population had turned from excess to a dull despair; mass suicides occurred daily and outbursts of insanity made life a hell for those who remained alive. Fire, pestilence, and famine swept the country. Even the stronger men, the scientists within the Circle, were beginning to crack under the strain.

On March 19, the green ship of the Exterminators appeared over North America, a glittering, eerie spot in the bright, Spring sky. Hollow, conical rays burst from its under side, encircling Boston, New York, Philadelphia, Baltimore and Washington.

On the control platform of the Convertor stood Steve Sheridan, anxiously watching the rows of gauges, of indicators. Some distance to the right of him, her eyes glued to the finder of a powerful telescope, was Stella. The street outside was silent as the crew of a heat-ray battery crouched over their big projectors, awaiting a word of command.

The President, white-haired and gaunt, touched Steve's arm.

"The purple ray is getting closer," he muttered. "Isn't it time to start?"

"Start?" Steve Sheridan smiled. "I

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started ten minutes ago!"

"But" . . . the President glanced at the narrowing ring of purple, back to the giant convertor . . . "with five billion volts—"

"No big light or noise to this. You can see a glow in the tubes though. As a matter of fact, it's not really a weapon." He bent, turned one of the dials. "Back in the early Twentieth Century scientists, after ages of fantastic efforts, began to accomplish certain minor transmutations of metal. Very crude, very minute, but a start. Then space travel and an abundance of rare metals from other planets caused them to abandon their efforts."

"And this machine—"

"This Convertor expels a stream of He^{++}, or helium ions, as well as Richardson's omega ray. If, as I believe, this green, heat-reflecting metal is Forty-three on our table of atomic weights, then the expelling of one proton, or hydrogen nucleus, from the nucleus of its atom, should transform it into Molybdenum. And we know Molybdenum to have no heat reflecting qualities, although it has an extremely high melting point, 2,620 degrees Centigrade, no doubt because of its close atomic relationship to the green metal Forty-three."

The President glanced at the contracting circle of purple, now no more than a half-mile in diameter. High above the green spot seemed undisturbed, continuing its work of destruction with cold, methodical precision.

"How will you know when the change is completed?" the President asked nervously.

"Miss Morgan is watching the ship." Steve Sheridan spoke with difficulty. The nearness of the purple ray was causing a fierce aching, a terrible weakness, throughout his body.

SUDDENLY he saw Stella topple from her seat. Beside him the President had fallen unconscious. With a quick leap, his legs bending limply, Steve reached the telescope, peered through it. The ship of the Exterminators, instead of glowing with its usual sickly green, was a bright silver, the shining lustre of Molybdenum!

Reeling, Sheridan pressed the signal to the heat-ray battery. The soldiers, picked men, were nearer the centre of the inexorable purple ring, not yet under its influence. Dimly, he saw them swing their guns, saw rays, like hot spears, thrust upwards. For a long instant nothing happened. Then, the purple ring disappeared.

Steve Sheridan glanced at the sky.

The tiny speck which had been the ship of the Exterminators, was disappearing in a wisp of smoke!

A white hand touched his arm.

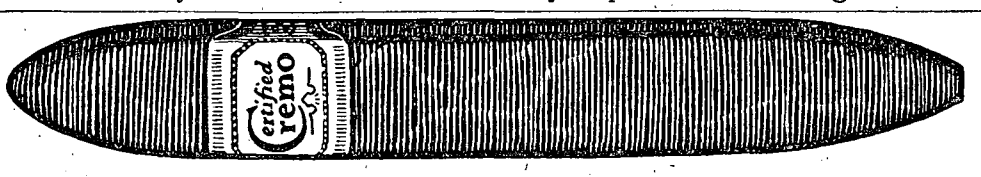
"We can go back to Io, now, Steve," she whispered, "Go back and found a new colony at Xenis."

Very tenderly Steve Sheridan bent to kiss her. As he did so, he heard the President's voice behind him.

"Scientific triumph," he was saying. "The savior of the Solar System. Any honor that you wish is yours!"

He looked up, shook his head.

"Thanks," he said, "but I'm not interested. We're going back to Io and be just plain human beings."



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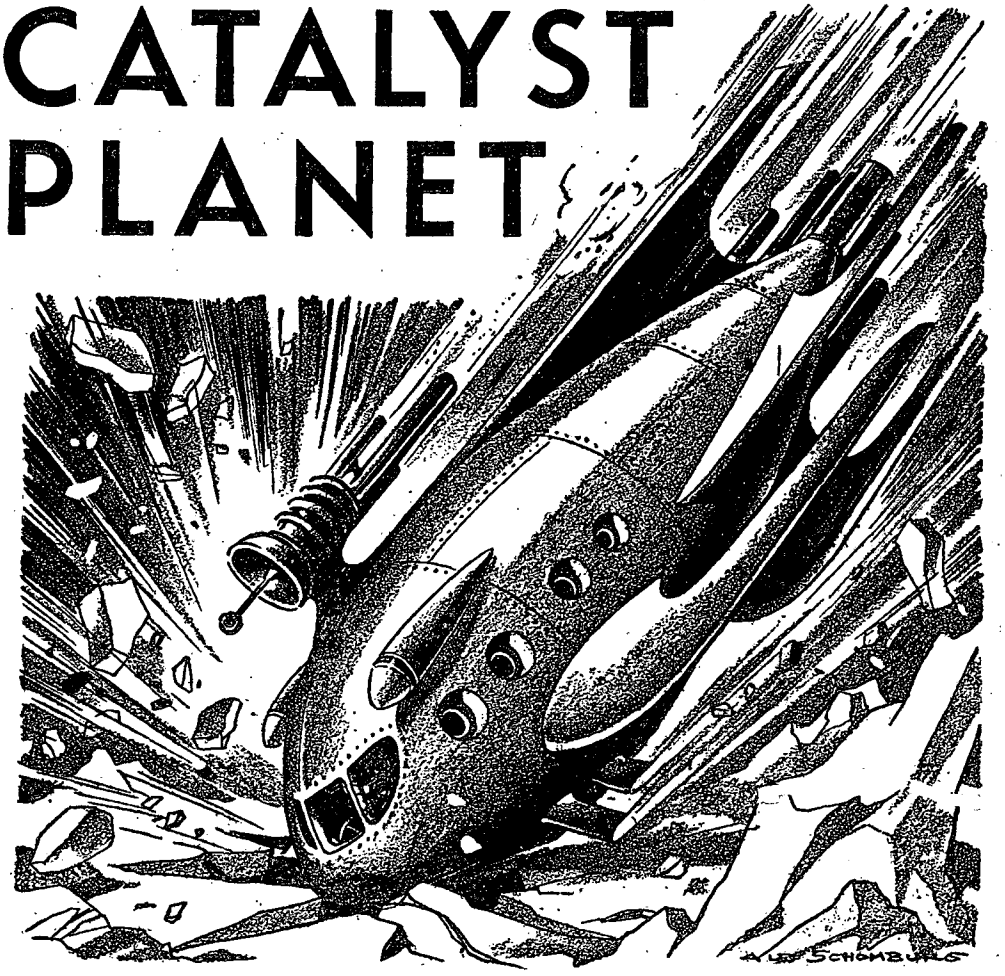

An instant later the ship struck

In the Dark Rim of Mercury's Twilight Zone, Men of the Future Play a Strange Game of Wits for a Scientific Treasure!

By RAYMOND A. PALMER

Author of "The Symphony of Death," "The Time Ray of Jandra," etc.

SAVAGELY Paul Shilling crumpled the piece of paper clutched deeply in his deeply tanned hand and threw it into a corner of the control room of the freighter *Falcon*. His blue eyes snapped resentment.

"Conscripted!" he exploded. "Can you imagine it, Thorssen? Three years I sweated like a pig out in that damned heat and dust to get those iron catalysts, and now they hand me a piece of paper and say it's not mine!"

Lars Thorssen, typically Norse, blond-bearded, blue-eyed, huge, stared at him calmly.

"It's your duty," he said in gruff tones. "That paper is your commission in the army, and orders to convey your cargo to Earth."

"Commission?" barked Shilling, exasperated. "Mercury is neutral mining territory. No government exercises authority here."

The grizzled Norseman shook his head. "Mercury is no longer neutral;

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she's the spoils in the war, and Venus wants her."

"That may be, but these catalysts are mine, and I'll be damned if I give them up!" Shilling's anger grew.

"You'll be shot if you don't," Thorssen said flatly. "Besides, what great difference does it make? You'll be paid."

"Paid?" Shilling waxed sarcastic. "Yeah, about a tenth what it's worth, if and when I eventually collect!"

Thorssen's gaze leveled at him from beneath jutting brows. "You aren't the only one, young man. I've got the same slip of paper, and my ship has been appropriated. I'll be paid, too, when you are. The least we can do is our duty, like men, and quit acting like children who've been deprived of their candy."

Shilling's neck began to burn, and for a moment he stared at the older man, then his gaze dropped a trifle ruefully.

"I didn't look at it that way," he said. "My ambition has been to get enough to open Starways Engineering again. The depression of Twenty-one nineteen ruined the company, and killed my dad."

"I know," said Thorssen, staring out of the port. "But war is worse, and if Venus wins. . . . Well, ten shiploads of catalysts like the one you've got in the lifeboat compartment wouldn't do you any good."

SHILLING also stared through the port. Outside lay the lifeboat it had been necessary to discard so that his own little rocket ship could be accommodated with its precious cargo. His gaze roved across the frozen ground to the fog-obscured ice barrier, jagged and pressure-ridged, that clenched its frozen grip about the dark rim of Mercury's twilight zone.

He contrasted the scene with Hotside, where he'd spent those three years in a hell of heat and dust. Strange planet, indeed, was Mercury, with only its sunward side blanketed with life-giving gases and only the narrow ring of the stormy twilight zone endurable without space-suit protection.

And amazing too, the contrast of the two hemispheres! Colside, airless and silent, lit only by astonishingly brilliant stars, that shone, but cast little light except on the white seas of perpetually frozen oxygen that filled the deepest valleys. And Hotside, swept always by howling storms of heated murk, and in spite of hot Sun, as vision-blinding as darkness could have been. What little there was to be said in its favor was the comparative ease of mining catalysts, lying loose in powdery soil.

Weird, those catalysts, and important. Vastly so. The science of metallurgy had undergone drastic change upon discovery of their existence on Mercury. Inert, yet possessing strange qualities of spontaneous movement almost like instinctive life, these crystals burst into tremendous activity upon contact or association with the particular metal to which they bore an uncanny atomic affinity.

They rapidly dissolved that metal into gas, which immediately passed off and eventually recondensed, in absolute purity, leaving only waste slag behind. Smelting ores to obtain the pure metal had become an obsolete and costly process of metallurgy.

It was the iron catalyst, most valued, that Shilling had mined.

There were other catalysts, some of commercial value, some worthless, and a few extremely dangerous. For instance, the carbon catalyst, extremely rare, but the most avid dissolver of all. Nothing containing carbon was immune to its attack. To it, scientists attributed the deep drifts of pyritic dust that choked the surface of Mercury in some places miles deep.

Shilling broke off his musing abruptly.

"When do we take off?" he queried.

"Odin knows!" growled Thorssen in irritation. "We've got to wait for two more passengers."

Shilling jerked his head around. "Two more?" What other passengers are there in this hell hole?"

"Secret service men, I think. One came aboard about fifteen minutes ago, from Colside. And I've been radioed to wait for two more."

Thorssen's keen blue eyes still

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scanned the ice barrier. Suddenly they centered on something as Shilling peered in the same direction. Down the precipitous slope plunged a tractor-bus, proceeding in haste bordering almost on the foolhardy.

Both men looked at each other.

"So that's the kind of fools we are waiting for," remarked Thorssen.

REACHING the ship, the tractor-bus stopped and disgorged two fur-clad figures who ran for the still open port. As they vanished from view, Thorssen stepped to the audiophone. The lowered port slammed shut in response, and as the newcomers were shown into the control room by a sailor, the shuddering of the hull that betokened gradual firing of the keel rockets evidenced itself through Shilling's soles.

Shilling looked the arrivals over as Thorssen scanned the papers they presented. One was tall, saturnine, with sandy red hair, tight, narrow lips, and narrow-slitted eyes. The other was dark-haired, with unwinking black eyes and deeply tanned features. He seemed the reckless adventurer type.

"You Carl Wedrig?" Thorssen inclined his head questioningly toward the saturnine one.

"Right," replied Wedrig in cold, clipped tones. "My assistant, here, is Arnold Horne. It is imperative that you take off at once, and navigate this ship to Earth."

Thorssen's whiskered chin jutted out a little truculently, and he frowned heavily. "While aboard my ship, you will refrain from giving orders," he said bluntly. "I have absolute authority, and I already have my orders as to navigation. Is that clear?" He turned to the waiting sailor. "Show them to their staterooms," he directed.

Wedrig stared a moment at Thorssen, then turned coldly and made his way to the control room, Horne and the sailor on his heels.

Shilling grinned openly as they disappeared. An old war-horse was Lars Thorssen, tolerating not even presumption aboard his ship, a determined stickler for discipline, and above all, duty. Shilling was still grinning as he turned to the port to observe the take-off.

It would take about three hours, he knew, to circle the planet, passing over Colside, so that the ship could launch itself in the proper direction to reach Earth.

Already as he looked down, the ship had risen above the ice barrier stretching to north and south, its white bulk extending into the gloom like a vast silvery ring, encircling the whole planet. One side was dimly lit by the lurid rays of Sun, coming through the colorfully swirling dust clouds; the other inky black, vanished into a region of ebon.

When the ship had proceeded into the darkness, it became less black, taking on a dull grayishness as all sunlight vanished, to be replaced by gleaming starlight. Below stretched an ominous, rather uninteresting landscape, dotted here and there with whitish patches.

Tiring of the scene, Shilling left the control room.

At the far end of the corridor outside an approaching figure halted him; a white-haired elderly man, whose skin seemed almost as white as his hair. That, apparently, was caused by lack of sunlight, rather than ill-health, for he was robust and erectly confident in his stride. Shilling leaped forward with a glad cry.

"James Morgan!" he exclaimed. "My old teacher, of all people! Where did you come from, how did you get here, and where did you disappear to when Starways went broke? The whole Solar System has been buzzing!"

"Paul!" the older man interrupted the flood of questions incredulously. "What are you doing here?"

SHILLING pumped Morgan's hand. The older man finally pulled away, flexing his arm with a wry look.

Still the exuberant youngster I tried to train to succeed your father as an engineer, eh? Well, if you must know, I've been in hiding, working on something that I hoped would mean new life for Starways again, but now"—his face sobered— "I'm afraid of this war, son. It's going to be terrible, unless I get through safely, and convince our government I've really got something."

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Shilling stared at him. "You mean you've invented something new, that will help us to win?"

Morgan nodded. "Part of it I had already completed when the crash came. A foreign power was after it, which is why I disappeared. I reasoned if nobody at all knew my whereabouts, the secret would be safer, and I had to finish its application."

"Is it a secret from me?" hinted Shilling with an expectant grin.

"No," Morgan glanced around cautiously. "I don't mind telling an old pupil. It's a new type of artificial catalyst that breaks down the molecules of lead into an explosive gas with tremendous power, almost approaching that scientific dream, atomic energy. I've built a new ship which uses this power, and it's invincible. I left it in hiding, because if it should be captured, it could be copied."

He glanced at Shilling with a smile. "And now, tell me about yourself, Paul," he suggested.

Shilling shrugged. "Nothing to tell—now. I did have enough iron catalysts to reopen Starways, but I've been ordered to bring it home and surrender it to the government."

Morgan looked at him soberly. "It's tough, Paul, but don't give up. After the war is over, we'll get together and make Starways what it used to be. I've been dreaming too, for three years."

The muffled bark of a pistol shot echoed down the corridor. A hoarse scream shattered the air, followed immediately by the thud of a falling body.

Startled, Morgan and Shilling whirled around. The prostrate body of a sailor lay on the corridor floor at its far end. Over the corpse stood Carl Wedrig, gun in hand. Behind him was Arnold Horne.

"There he is!" Shilling heard Horne exclaim.

"Put up your hands, both of you!" rasped Wedrig, advancing.

"Those men," whispered Morgan, white-faced. "They are Venus spies, after my secret!"

"At last we've got you, Morgan," Wedrig said grimly, covering them. "And now you're going to take us to where you've got that ship of yours hidden! It's somewhere on Colside, just about this area, we know, but we haven't been able to locate—"

Taking a desperate chance, Shilling hurled his body recklessly forward, ignoring Morgan's hoarse shout of warning. Hastily Wedrig whipped his gun up, and it spat deafeningly in the narrow confines of the corridor. Shilling felt something beat against his skull like a sledge-hammer, and he reeled. Blackness replaced consciousness. . . .

HIS first realization, as he came to his senses again, was of the terrific ache in his head. He raised himself to a sitting position and with shaky fingers gingerly felt his temple. His hair was clotted with sticky blood. Evidently Wedrig's bullet had just grazed his skull.

"Wedrig!" he exclaimed suddenly, glancing about in awakened alarm.

The corridor was deserted, and there was no sign of Morgan.

Shilling pulled himself to his feet and made his way dizzily to the control room. At the door he halted, staring at the prostrate form of Lars Thorssen, lying tightly bound and helpless.

"Loose me, quick!" gasped the freighter captain. "The crew is locked in the engine room, and we're running wild!"

Shilling leaped forward, his senses clearing rapidly. In an instant Thorssen scrambled to his feet and rushed to his control board. Several levers he flung, then grunted in relief.

"Everything okay." He sighed explosively.

Shilling gripped his shoulders. "Where's Morgan?"

"Wedrig and Horne took him—in the lifeboat," answered Thorssen heavily.

Shilling leaped to the port and stared out. The *Falcon* was some five hundred miles above the surface of Colside, and already out in the sunlight. Immediately below was a bright speck that vanished suddenly as it entered the planet's shadow. It was heading directly for a large white spot that indicated a huge frozen sea.

With sudden decision he sprang to the air-vent in the wall. His fingers pushed it aside and air screamed into

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the vacuum beyond. Then rapidly he flung the lifeboat compartment open to reveal one empty stall and his own rocket ship resting in the other. He leaped for it.

"What are you going to do?" asked Thorssen suddenly.

"Rescue Morgan!" Shilling flung over his shoulder.

"You can't do that!" objected the Norseman, leaping forward to restrain him. "He'll have to take care of himself. We've got our own duty to perform, to get those catalysts through to Earth."

Shilling shook off his restraining hand. "Duty be hanged," he said recklessly. "Don't you realize they'll kill him before he tells his secret? And besides, Earth needs that ship!"

"What ship?" Thorssen went grim. "Stand where you are," he commanded, whipping out a gun. "Don't you know you'll be a traitor if you leave this ship before we get it to Earth? You'd be court-martialed and shot."

Shilling faced the Norse captain, hesitating a moment as if in indecision while Thorssen eyed him dubiously. Then with a leap he lashed out a fist that caught the Norseman unprepared, landing flush on the point of the jaw. Thorssen went down with a crash and lay still.

"Sorry, old man," said Shilling gently. "But it was the only way."

Swiftly he closed the compartment and stepped into the tiny ship. Manipulating the controls that automatically opened the port in the outer hull, he braced himself for the sudden surge forward. It came, and the boat dropped rapidly away from the *Falcon's* belly.

ONCE free, he headed for the white sea, with full power. The ship behaved oddly, shuddering and swaying. Puzzled, he glanced to his rear, then uttered a cry of alarm. Bellying out behind him was a vast mushroom of blinding white flame. It stretched for miles before it thinned out, creating a spectacular comet's tail, with the ship as its head.

"The catalysts!" he gasped, as he realized the phenomenon was caused by a cloud of dissolved chrome steel gas absorbing the light of Sun. "A box has broken!"

Hastily he donned an aluminum space-suit, then sat before the controls. He turned on the bow rockets, braking his fall. The tiny ship shuddered and shook, swerving wildly on a tangent, parallel with the surface of the great sea beneath.

As he hung on grimly, lurid red flames far to the left, just above a tiny island, lit the darkness. Shilling realized in the split fraction of a second remaining to his observation, that his quarry was landing there. He marked the distance and direction hastily.

An instant later the ship struck. There was a flare of exploding rocket fuel that melted a great hole in the ice, and sickeningly the ship dropped downward into an abyss of flaring blue. With a solid crash the keel struck bottom and Shilling felt himself hurled forcibly clear of the wreckage.

For a moment he lay dazed, then slowly struggled erect, straining with all his muscular force against an oppressive liquid weight that impeded his movements.

Surrounding him was a flaring blue radiance, befogged with swirling opaqueness that alternately cleared and murked with the heat that came from the wrecked rocket ship, rapidly being dissolved by the avid catalysts in its belly. He was trapped within a giant bubble, far beneath the surface of the sea of frozen atmosphere; a bubble composed of air so thick as to be almost liquid in its composition. His veins became ice with awareness that when the heat of the disintegrating ship was gone, the atmosphere would again become solid, clutching him in an eternal icy tomb.

Even as he stood there, buffeted about by the swirling liquid air currents, the blue-lit walls of the bubble were closing in upon him. Heat!

Clumsily he fumbled at the belt of his space-suit and detached his Hurley-Hodgkins radium gun. All about him crystallizing flakes formed on the exposed sea-floor. An advancing windrow of the stuff reached his boot. Chilling cold ate rapidly through to his foot.

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Hastily he jerked free of the congealing stuff, advancing closer to the swirling turmoil near the ship. Hellishly cold, that innocent white snow. He turned on the Hurley-Hodgkins.

About him the swirling atmosphere crackled and hissed with its high tension current. The blue light intensified.

"Neon," he muttered. "More neon than nitrogen in this air."

Before him the ship was almost disintegrated into a pile of non-iron parts, and the bubble that held him prisoner was now very small, maintained only by the heat of his gun.

Momentarily safe, he took stock of his perilous position.

Hooked to his suit was an automatic, a flashlight, and on his back was an additional cylinder of oxygen. Four hours of air in it. Perhaps three left in the one he was using. In the wreckage he found another.

ELEVEN hours of life, providing his radium gun held out. It should last at least that long. There was almost no heat loss in his strange prison. Food? Water? He shrugged. He wouldn't need any, unless—

That island; his only chance.

He looked at the tiny compass set in the arm of his suit. Perhaps five miles east, through solid ice!

Five miles—eleven hours. He grunted.

Hooking the precious air cylinders to his belt, he began a slow, laborious progress through the liquid medium of the bubble. Like some deep-sea monster lost in a sea of blue muck, he slogged heavily forward, toward the east. Perhaps twenty feet a minute he progressed, the tornadic bubble advancing with him, melting before and freezing perilously close behind.

Later on he noticed the gradual downward slope of the ocean floor, and simultaneously became aware of a greenish tinge permeating the blue of the neon radiations. In an hour the blue was entirely gone, replaced by a brilliant green that slowly gave way in turn to yellow.

Suddenly he realized the reason for the change. The neon condensations in this frozen sea were of a different character at deeper levels, and as he descended, the range of color also dropped down the spectrographic scale.

His progress was exhausting and he paused to rest. The bubble grew slowly larger as a reserve of heat built up.

A strange object on the ocean floor, at the very rim of the bubble, caught his eye. It moved and he stiffened, fingering his Hurley-Hodgkins in wary readiness. The thing struggled with obvious lethargy and effort to gain an upright position, allowing him a fuller glimpse, and amazement gripped him.

Was that tiny form *human?*

Stunned, Shilling advanced cautiously, keeping his radium heat gun trained guardedly to one side. He must avoid the danger of harm to the tiny creature until he had fully determined what it was, and yet be in readiness in the event it proved menacing. However, it did not seem to offer anything of the sort.

It was about eighteen inches in height, and seemed curiously feminine. The greater portion of its body was covered by a brilliant yellow shawl—or was it white? He decided that it must be.

The neon light effectively blotted out all positive identification.

But how could anything be alive in this hellish stuff?

He stood within several yards of it now, and watched its struggles. It seemed reviving from a deep sleep, or from the dead. Shilling's scalp crawled as he contemplated the tiny being. Abruptly he found himself face to face with the creature as it struggled erect, revealing a tiny, elfin face, curiously human, yet not human, its rounded head topped with metallic golden scales that seemed half scale and half feather. Each tiny section was rimmed by a yellow frill that reminded him of sweeping eyelashes on a thousand yellow eyes.

The features were regular, and curiously beautiful. Beady, liquid black eyes were fixed on him in wondering astonishment, but there seemed no trace of fear in them; only a vast curiosity.

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NOW that the creature stood erect, the body was completely cloaked in that brilliant yellow shawl, which protruded oddly like wings above its shoulders on both sides of its graceful, gleaming head. It struck Shilling with force that the little creature was marvelously like the common conception of an angel standing with folded wings.

With this comparison came corroboration as it spread wide the shawl in a burst of golden glory. That shawl was a pair of wings! They stretched out, fluttering, trembling like leafy gold.

Shilling stared, thunderstruck. The entire body now revealed, covered from tiny feet to erect head with microscopic feathered scales, was that of a perfectly formed female human form! And yet, he knew that the creature was absolutely unhuman. In form only did it resemble the creatures of Earth.

The tiny mouth opened, and faintly through his helmet he heard liquid, silvery pipings. Oddly birdlike, they seemed, and pitched high in the scale.

Assured now that there was nothing of menace in this lovely elfin creature, he answered.

"You're a little living lie!" he exclaimed. "How can you be? Breathing air as dense as water—in fact, almost liquid air, with a temperature of around seventy degrees below zero, Fahrenheit!"

He paused a moment, then resumed in wondering tones: "And you must have been frozen in this sea since it first congealed—centuries ago, ages! Human though you look, you surely aren't!"

Tentatively the nymphlike creature flapped its wings and rose a few feet from the rocky floor. Then abruptly a pained expression crossed its lovely features, and a hurt, surprised look came into its black eyes. It dropped down, drooping weakly.

"Poor thing!" exclaimed Shilling. "You don't realize what ages have passed. Your muscles are atrophied. It's a wonder you can live at all, much less fly—or swim—in this hellish stuff!"

He leaped forward, tenderly lifting the figure in his free arm and staring down into its eyes that were curiously regarding his face through the visor of his helmet. It struggled a bit, twined one arm over his shoulder, and lifted up so that it might peer directly in at him.

He started at the expression of intelligent appraisal that swept into the black depths of the tiny eyes.

"Found out we've something in common, eh?" he asked.

Then, amazingly, a smile flitted across the tiny features. The nymph cuddled closer, trustingly, into the curve of his arm. Its utter trust and disregard of the possibility of menace was astoundingly childlike, in contrast with its seeming intelligence.

"All up to me, eh?" he questioned wonderingly. "All this is too much for you. And I don't blame you. Held in suspended animation for Lord knows how long, and now in an environment that I'll swear isn't your natural one, although you must be one of the native beings of this planet. Judging from you, Shapleigh was right when he said that if any inhabitants ever lived on the dark side of Mercury, they must have been capable of withstanding intense cold, and perhaps of breathing a dense, almost liquid atmosphere. More than likely fish, he said. I wish he could see you. The original angel fish!"

His voice took on a serious note. "You know, Cherub—that's what you are, a cherub!—you're in a bad spot. As bad as mine. I've got about eight hours of air. And you've got about the same before this Hurley-Hodgkins gives out. After that, you go back to sleep again, unless—"

AS he halted, the nymph smiled up at him again.

"If only you wouldn't do that!" he groaned. With an effort he returned the smile.

"Okay, Cherub, we'll carry on together until we get to the end of the trail, whatever it is. That's a promise."

There seemed comprehension in the eyes fixed on his, but Shilling dismissed the thought doubtfully.

He moved slowly along, glancing oc-

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casionally down at the lovely little creature in his arms. Beady eyes were fixed ahead in wonder, and against his arms he felt the pressure of its labored breathing, quick and forced, and realized that the pressure here was too dense.

It was obvious the nymph had normally lived in a less dense atmosphere, and later, when his steps began to lead upgrade for the first time, he received proof. The tiny form grew more active, the breathing motion of its breast more regular, less panting.

Ahead, the light of the neon green became tinged with orange and he stared at it in puzzlement They were no longer ascending, but traversing a level stretch of ocean floor. Orange, in this spectrum gauge of depth, portended a much deeper place than he now occupied.

"What the devil!" he exclaimed.

The ice wall glowed with orange, and he realized that the new glow was independent of his own bubble—that it came from beyond. In a moment he stood amazed on the brink of a precipitous cliff. He was inside the edge of a great bubble on the sea bottom.

Down below all was brilliant yellow, in contrast with the green of his own level. A flaming fan of light, slightly orange at the bottom, ranging to yellow and fading to green at the top, stabbed up from a giant radium heat projector, permanently mounted in the sub-valley. Below him lay a giant space ship of strange design.

"Morgan's ship!" he breathed. "I've found the hiding place!"

The nymph in his arms stirred, then abruptly struggled from his grasp. Before he could prevent it, the cherub floated gently down into the valley on outstretched wings. He saw her reach the bottom safely.

"Darned if she isn't a plucky little devil!" he exclaimed in relief.

It took him a half hour to make his way down the cliffside.

Reaching the bottom he stopped dead in his tracks. Someone was emerging from an opening in the opposite cliff wall!

As quickly as he could, in the thick atmosphere, he moved into concealment behind the giant Hurley-Hodgkins and watched closely. The aluminum-suited figure advanced to a slight depression, then halted suddenly, staring down at something on the ground. At first Shilling could see nothing, but then a familiar little figure clambered from a crevice and walked confidently toward the space-suited figure. Shilling sucked in his breath sharply.

"It's Cherub!" he exclaimed in dismay. "She thinks it's me!"

He left his concealment and started forward on the dead run, the almost liquid air making his effort tremendous. Suddenly the other saw him and lifted his head, startled. Ten yards away Shilling leveled his weapon and shouted loudly.

"Don't make a move!" he yelled. "Or I'll blast you to a crisp!"

"Paul!" came a muffled, incredulous ejaculation.

Shilling halted, stunned, peering through the yellow atmosphere.

"James Morgan!" he gasped.

JAMMING his weapon into his belt, he advanced as quickly as possible, arms outstretched. In a moment the two clutched metal-clad fingers.

"But," protested Morgan bewilderedly, "we saw your ship wrecked—"

Shilling grinned. "You can't kill me. I just—" He halted as a startled expression of alarm leaped into Morgan's eyes.

With a flapping of wings, the nymph settled on Shilling's shoulder and draped affectionate arms about his neck. Morgan moved as though to knock it down.

"Don't!" Shilling said hastily. "She's a friend of mine."

"Friend!" gaped Morgan. "But great God, man, she's dangerous. Your suit. She—"

"Dangerous? My suit? What do you mean?"

The scientist pointed to the crevice. "Aluminum catalysts."

Shilling was bewildered. "But how does that make Cherub dangerous?"

"She was eating them!"

Shilling stared. "You must be mistaken."

Morgan shook his head determin-

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edly. "I'm not. She was eating with great relish. What is she, and where did you find her?"

The lovely little form perched on Shilling's shoulder fluttered once more to the ground and returned to the aluminum catalysts. As he watched her eat, Shilling explained how he'd found her, and the older man marveled.

"Frozen for ages, at nearly absolute zero—and living! It is incredible!"

Despite his interest, Morgan tore his attention suddenly away from the tiny creature and gripped Shilling's arm.

"Paul, we've got to get away from here. Wedrig has sent Horne to Earth with carbon catalysts! You know what that means?"

Shilling paled. "An Earthman wouldn't do that!"

Morgan grunted. "Wedrig would. I've found him to be absolutely ruthless."

"How did you get out here?"

"I know a few things about my laboratory, Wedrig doesn't, and I wasn't locked in as securely as he thought."

Shilling pointed. "Does that ship fly?"

Morgan's eyes glistened. "Nothing like it in space!"

"Good!" said Shilling. "Then let's get aboard."

He advanced to pick up the cherub, but possessed suddenly by some imp of perverseness, she fluttered away, gliding gracefully through the yellow, neon-lit air. Straight toward the opening in the cliffside she flew, vanishing within.

"Damn!" said Shilling. "I've got to get her."

Morgan gripped his arm. "Perhaps it is best," he ventured. "Our atmosphere is different."

Shilling shook his head. "She breathed better in less dense atmosphere, and I'm convinced she can live in normal air. Anyway, I brought her this far, and I won't leave her. There's something too human about her."

Morgan hesitated a moment, then dropped his restraining hand.

"You're right," he agreed simply. "Go fetch her. I'll wait here on guard."

"Better still, you go aboard the ship and get ready to take off in a hurry. Then wait half an hour. If I haven't returned, go. Do you get me?"

Morgan nodded soberly. "I understand. But you'll be back in time. She can't get past the airlock, about six-hundred feet in."

SHILLING turned to the tunnel and progressed about a hundred yards without sign of the cherub, then suddenly an inward gust of air almost bowled him over.

"The airlock!" he exclaimed. "It's been opened!"

Cautiously he proceeded, encountering no one. The airlock, closed, loomed up in the gloom. Puzzled, he examined its mechanism.

"Opened it herself!" he marveled. "As tiny as she is."

Clamping his jaws determinedly, he opened the lock in his turn and entered, with the resultant inrush of air. Closing the outer door, he manipulated the inner. A dimly lit corridor was revealed beyond. Breathable air in here. Cautiously, to insure quiet progress, he removed his noisy space-suit and advanced, gun in hand.

Something hard crashed against his skull from beside the inner door, and flaring pinwheels of fire spun wildly in his brain before he sagged down into blackness. . . .

He opened his eyes to find himself sitting with his back against solid stone. His hands were bound behind him, and he was perfectly helpless to move more than a few inches.

Before him stood Carl Wedrig, a sardonic leer on his features. Between them was a boundary of gleaming copper, completely encircling him. Inside the barrier, on the floor, was a small copper box.

"Take a good look around, Shilling," grated Wedrig. "It'll be your last look. And especially notice that box. Carbon catalysts. I'm going to open it now and dump them on the floor, on your side of the barrier."

"You don't dare," Shilling felt a curious chill course up and down his spine.

"Oh, no?" Wedrig advanced, picked up the box, and carefully pried the lid

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open, staring down at the black crystals.

"You wouldn't think from looking at them what they could do," he remarked. "Just think of it. In a few minutes you'll be changed from a living man to a pile of gray dust on the floor, and a smudge of greasy soot on the walls!"

Carefully he stooped and tipped the box until the carbon catalysts slid out on the pyritic stone.

Fascinated, Shilling watched the evil black crystals inch slowly about in their haphazard jumping motion as microscopic crystal facets changed shape under the strange force exerted by close proximity to carbon. They blundered about, against the copper at points, but progressing generally in his direction, drawn as though by a magnet whose force was exerted in jerks.

Sweat rolled off Shilling's body as he tore savagely at his bonds. But they held tightly, and even his most frantic efforts served only to draw the knots tighter.

Nearer to his foot came the ominous menace. He drew back against the wall, until further retreat was impossible. The catalysts came on, seeming almost to sense the victim awaiting their attack.

They were within two inches of his straining form when suddenly there came the soft flap of wings and a shining white shape fluttered through the air, dropping gracefully within the barrier.

"Cherub!" gasped Shilling incredulously.

"What the hell!" rapped Wedrig, stepping forward in amazement, then halting, leering.

THE nymph smiled at Shilling bewitchingly, advanced toward him, perching on his shoulder and twining her slim arms about his neck in her affectionate manner.

Horrified, Shilling tried to shake her off, but could not.

"Get away, Cherub!" he begged. "This is the end of the trail for me—get away!"

The nymph uttered a few piping, bird-like notes, then her gaze lit on the catalysts. She fluttered from his shoulder and alighted beside them.

"Don't—" began Shilling, then clamped his lips tightly. If she ate aluminum catalysts, why not carbon?

The nymph extended one delicate hand and picked up a catalyst, examined it curiously, then thrust it into her mouth. Contentedly smiling, she swallowed it and reached for another.

Wedrig loosed a startled snarl and jerked his gun from his belt.

"Drop that gun, Wedrig," came a gruff voice from the dimness of the corridor beyond, "or you die!"

But Wedrig's weapon spat viciously, followed a split second later by a shot from the darkness. There came a thin, shrill scream from the nymph and she slumped down. Shilling stared at her, horrified. Forcing a smile to her lips, the tiny being struggled erect again, laboriously scooping the remaining carbon catalysts into her mouth. She swallowed them. On Wedrig's face was a strange blankness. He slid to the floor, jaw agape in death.

Lars Thorssen came forward, smoking gun in hand. Behind him came Morgan, and drawing a keen blade from his belt, he slashed Shilling's bonds, releasing him.

"Sorry, Paul," said Thorssen, "but I'll have to place you under arrest."

Shilling nodded briefly and crossed to the nymph who writhed on the floor in agony. Tenderly he lifted her in his arms. Her black eyes stared trustfully up into his, and in spite of her pain, her convulsed face smoothed into a faint, brave little smile. For a moment it remained, then she shuddered in his arms, the glorious snowy wings fluttered a moment, then drooped limply. She was dead.

"The end of the trail," he whispered, his eyes misty in spite of his best efforts to prevent. "Cherub, whatever you were, you were *more* than human!"

With a feeling of intense regret, he laid the still form down.

"What was it?" asked Thorssen, his tones gruffer than usual.

Silently Shilling looked at the still figure, lovely body wrapped in its winged shawl, then: "An angel, I think," he responded. "A child angel."

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"Perhaps more than that," offered Morgan, his aged eyes gleaming. "An hour or two in my laboratory, to discover the chemical secret of her digestive juices, and the menace of carbon catalysts released on Earth will be gone."

He paused.

"And so long as you picked up those catalysts before you followed Paul here, I don't think your prisoner will ever face court-martial. Earth doesn't punish for the things we have accomplished."

He picked up the cherub and vanished down the gloomy corridor.

Lars Thorssen looked at Shilling and grinned. "He's absolutely right, lad, but I'm going to keep right on doing my duty as I see it, at least till we get to Earth. After that, I'm afraid I'm going to turn traitor too, and forget all about my prisoner, unless it's to ask him for a job with Starways Engineering."

Shilling grinned back. "If you'd call a partnership a job, you've got it!" he said.

FORECAST for the NEXT ISSUE

PENTON and Blake! The Solar System's most colorful team of planet rovers! A daring duo of scientific explorers, discovering wonder after wonder on each of the nine planets—and the tenth, too!—are back again in the October issue of THRILLING WONDER STORIES.

They're in THE BRAIN PIRATES, a novelet by JOHN W. CAMPBELL, Jr., creator of the Penton-and-Blake team. If you've never read any of this popular series, here's your chance to meet the thirtieth century's Columbuses of space!

* * *

The hottest place in the world is Death Valley, particularly in the summer. It was a strange day when radio reports announced the incredible fact that, on July fourth, it snowed in Death Valley . . . a blizzard in the desert.

This amazing snowfall catapults a band of scientists into a maelstrom of startling cosmic phenomena. And this strange incident serves as the basis for THE CHALLENGE OF ATLANTIS, a thrilling novelet of sub-continental life by ARTHUR J. BURKS.

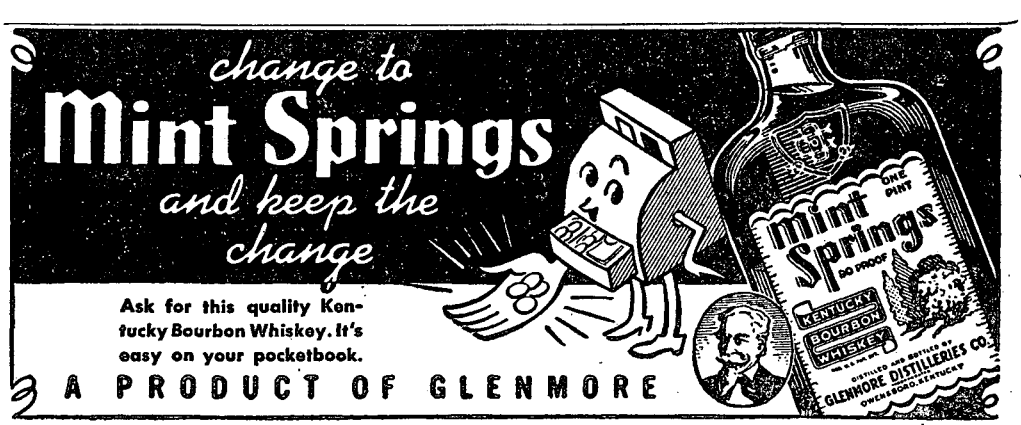
* * *

". . . . And now for our five-star believe-this-if-you-can of space," began Rod Shipkey, the famous television newsman. "There are three authenticated records of space-masters who, either by choice or force or circumstance, landed their craft on Satellite Five, outside Jupiter. None has ever been heard from again. . . . There is a strange extra-terrestrial form of life on that world, that—believe this if you can—breathes fire! Someone with courage will dare death some day and tear out the black heart of the secret that shrouds Satellite Five. Indeed, it's a surprise to me that the inimitable Carlyle has not already done so. Can it be possible that there's at last something in the Universe that blond daredevil hesitates to tackle? Believe THAT, ladies and gentlemen, if you can!"

Gerry Carlyle, globe-trotter of the future, never takes a dare. See what happens when she meets Cacus, the master of an alien world, in SATELLITE FIVE, a brand-new novelet by ARTHUR K. BARNES.

* * *

All these stories, plus other novelets and short stories are scheduled for the October issue of T. W. S. And there will be many surprises . . . a new humorous account of Tubby's adventure with the Three-Eyed man . . . a special science article . . . and all our regular departments and features.



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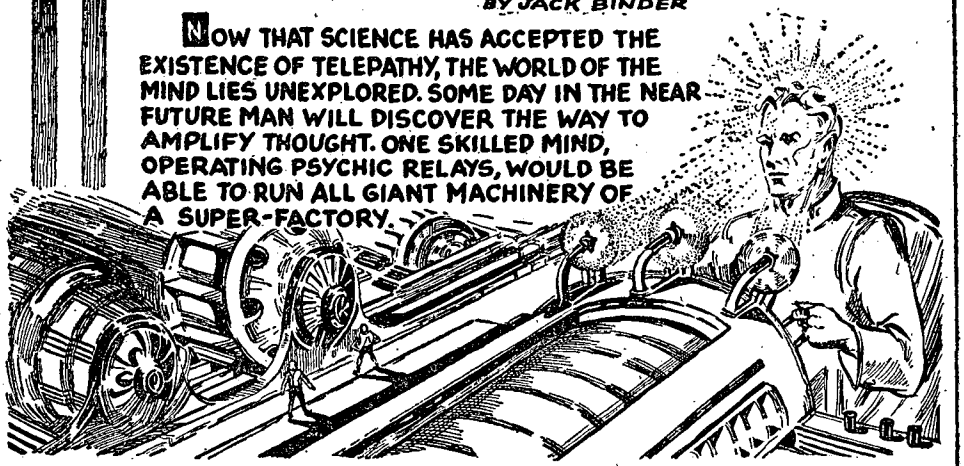
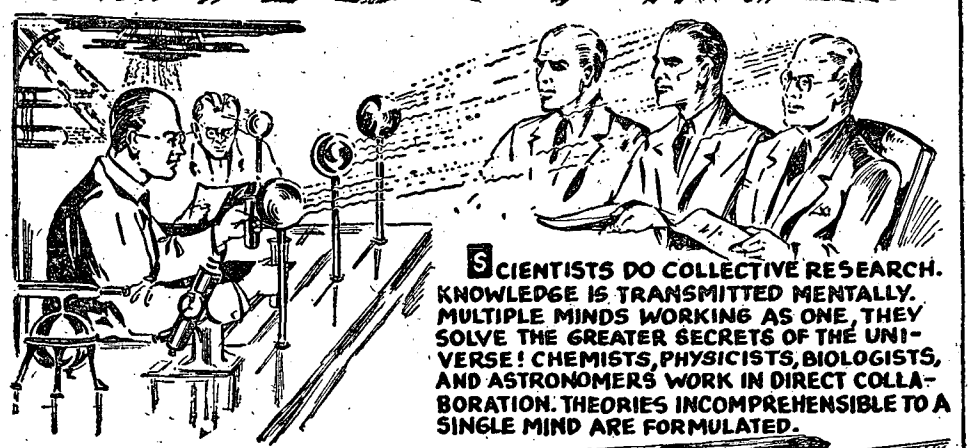
IF MAN MASTERED TELEPATHY!

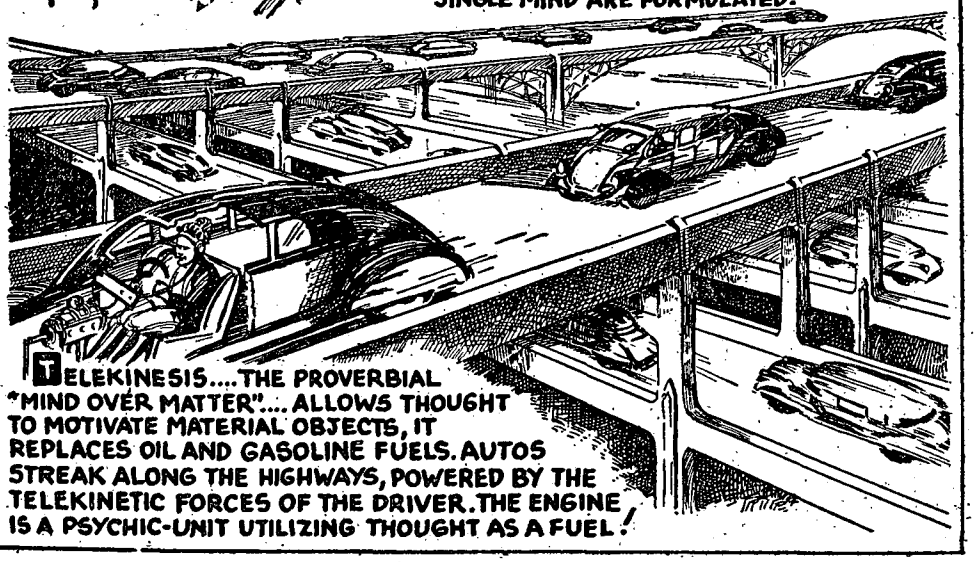
BY JACK BINDER

NOW THAT SCIENCE HAS ACCEPTED THE EXISTENCE OF TELEPATHY, THE WORLD OF THE MIND LIES UNEXPLORED. SOME DAY IN THE NEAR FUTURE MAN WILL DISCOVER THE WAY TO AMPLIFY THOUGHT. ONE SKILLED MIND, OPERATING PSYCHIC RELAYS, WOULD BE ABLE TO RUN ALL GIANT MACHINERY OF A SUPER-FACTORY.





SCIENTISTS DO COLLECTIVE RESEARCH. KNOWLEDGE IS TRANSMITTED MENTALLY. MULTIPLE MINDS WORKING AS ONE, THEY SOLVE THE GREATER SECRETS OF THE UNIVERSE! CHEMISTS, PHYSICISTS, BIOLOGISTS, AND ASTRONOMERS WORK IN DIRECT COLLABORATION. THEORIES INCOMPREHENSIBLE TO A SINGLE MIND ARE FORMULATED.



TELEKINESIS.... THE PROVERBIAL "MIND OVER MATTER".... ALLOWS THOUGHT TO MOTIVATE MATERIAL OBJECTS, IT REPLACES OIL AND GASOLINE FUELS. AUTOS STREAK ALONG THE HIGHWAYS, POWERED BY THE TELEKINETIC FORCES OF THE DRIVER. THE ENGINE IS A PSYCHIC-UNIT UTILIZING THOUGHT AS A FUEL!

Next Issue: IF SCIENCE

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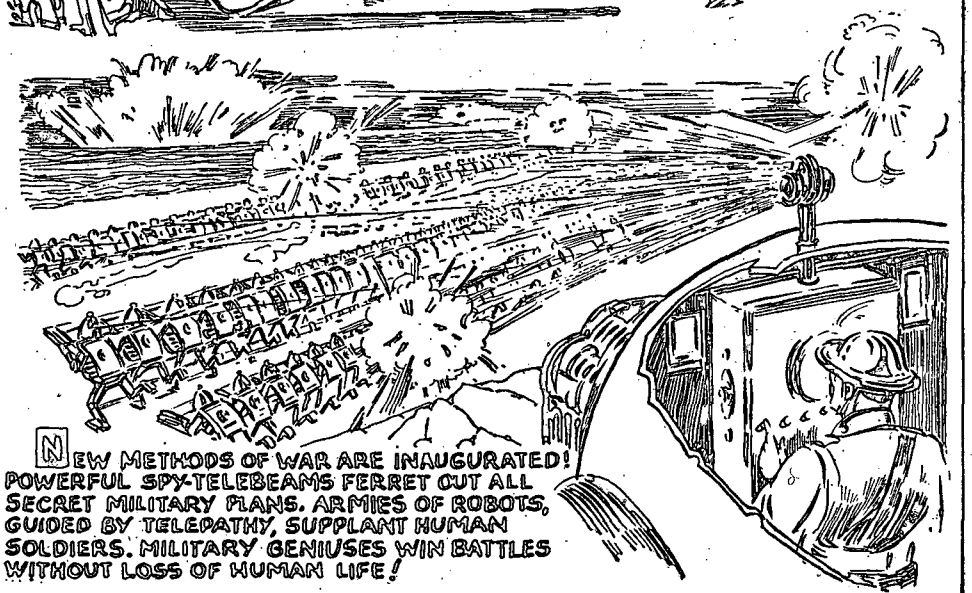
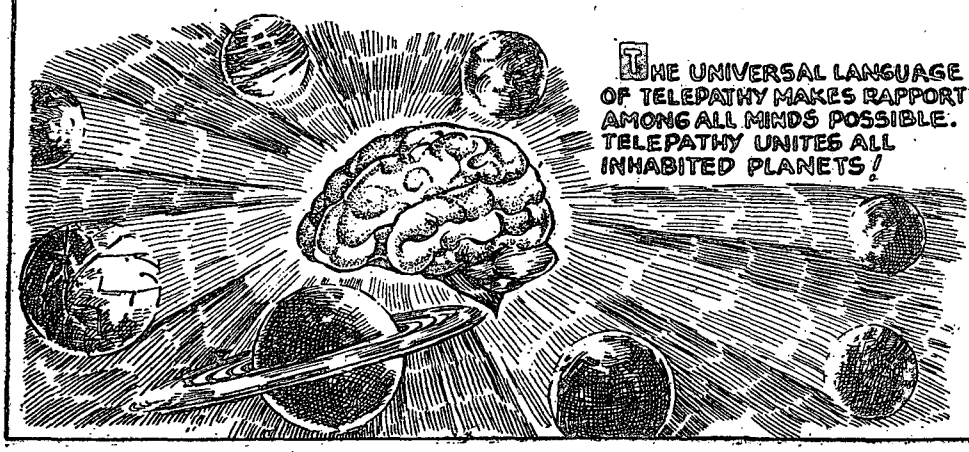
TEACHING BY TELEPATHY BECOMES POPULAR. EDUCATORS RADIATE FROM A CENTRAL STATION. ALL CHILDREN WITHIN RANGE LEARN THEIR LESSONS WITHOUT MOVING FROM THEIR HOMES. CLAIRVOYANCE, THE SISTER OF TELEPATHY, ENABLES THEM TO "SEE" BROADCAST DIAGRAMS AND PICTURES IN THE LECTURES.



NEW METHODS OF WAR ARE INAUGURATED! POWERFUL SPY-TELEBEAMS FERRET OUT ALL SECRET MILITARY PLANS. ARMIES OF ROBOTS, GUIDED BY TELEPATHY, SUPPLANT HUMAN SOLDIERS. MILITARY GENIUSES WIN BATTLES WITHOUT LOSS OF HUMAN LIFE!



THE UNIVERSAL LANGUAGE OF TELEPATHY MAKES RAPPORT AMONG ALL MINDS POSSIBLE. TELEPATHY UNITES ALL INHABITED PLANETS!

REACHES THE EARTH'S CORE

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Bartoh flung the switch

The THING FROM MARS

Laboratory Science Produces an Incredible Form of Matter!

By

RAY CUMMINGS

Author of "Around the Universe," "The Space-Time-Size Machine," etc.

"WHAT is this thing from Mars?" he thought.

He stood by the door of old Jons' laboratory with the light of the burning gases and the fluorescence from the dome painting his burly figure, his bullet head of close-clipped, black hair. His face, heavy-featured, thick-lipped, was grimly set. His little eyes gleamed with cupidity. His long arms dangled at his sides, with powerful fingers that twitched.

"What is this thing he is going to rebuild?" he thought. "If I had it, I could make myself rich."

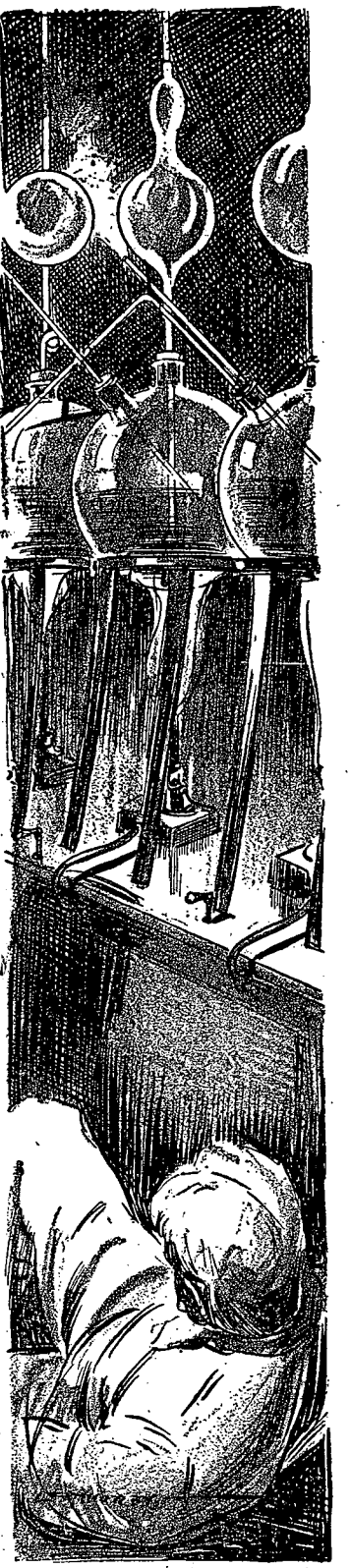
And aloud he said suddenly: "Did you call me? Did you want the laboratory cleaned now? It is very dirty."

The old chemist turned from the strong steel shelf by the laboratory wall where he was gazing at the dials that recorded the electronic pressure in the big, fluorescent dome.

"Eh? Oh, it's you, Bartoh? What are you doing here? I did not buzz for you."

"I thought I heard it," Bartoh said.

He wondered if his voice sounded queer. Slowly he advanced into the



The row of hydrogen torches seemed a little brighter

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room. There were only the two of them, here alone tonight in the little steel house which was old Jons' workshop and home. No one would hear Jons if he screamed. There would be no one to say it wasn't an accident that had killed the old chemist. There would be no witness, except Bartoh, his servant and laboratory helper.

At seventy, one could get absent-minded and make mistakes. There were many things here, hissing with a million voltars of electronic power, which if one touched, one was dead. So often Bartoh had been warned to be careful of them.

"I'll get the thing first, and then I'll kill him," Bartoh thought.

"Are you performing the experiment now?" he said. "The thing from Mars that you told me you could rebuild? What is it?"

Jons' hand was on a switch; he was intently checking the series of little dials whose pointers were swaying. Then he suddenly shoved at the switch.

The opal light vanished in the big dome of the fluorescent vacuum. The electron glare which had painted the frail small figure of the old chemist was gone. There was left only the flat, pallid light of the burning hydrogen torches that were ranged in a row on a high steel shelf with a series of duralite retorts over them. The flat, pallid light made the old man's seamed, thin face look bloodless—as though already he were dead.

THEN he turned, as the light vanished, and sat down on his little stool.

"Eh? Oh, well, I don't mind telling you, Bartoh. But this is only the beginning of my experiment. Everything is coming fine, but I shall not complete it tonight. I could rebuild the thing tonight, if only I—"

"What is the thing, Master? You said it will make you rich and famous."

"Oh! Well, I guess it will. Sit down and watch me, if you like."

Jons was smiling now. He was pleased with himself. One may smile and be pleased, and yet not be aware of death that is so close.

"Tell me," Bartoh said. He sat on a stool with his arms dangling between his knees.

"Tell you my secret?" Jons said. "No one knows that, as yet. But I'm convinced, if we could go to Mars, we would find it no secret at all. There was a meteorite fell, out here in my garden. Last year—before you came to work for me, Bartoh."

"I heard of it," Bartoh said.

"It brought me the remains of a new metal. A metal which I know exists on Mars—in a molten or gaseous state at least, because I have seen the lines of its light with the electro-spectroscope."

Carefully the big Bartoh was listening. When he got this thing he could wait a year or two—and who would ever be able to prove he had not made it himself?

On Mars, the old man was saying, there existed a new form of matter; a thing that was new to Earth. The Martian inhabita[illegible]s—if indeed there were any Martian[illegible]abitants—perhaps were putting it to [illegible]ny commercial usages. Here on E[illegible] it would be revolutionary.

"Of what use, Maste[illegible]" Bartoh asked.

Jons shook his head. "That I do not know. But anything so revolutionary will bring me fame and wealth. It will be an advancement of science."

He explained a little more. The meteorite, flaming in the Earth's atmosphere, had disintegrated this new substance which had been a small portion of its original mass.

"There was only a tiny fragment left, Bartoh." The old man's face was flushing with the memory. "It was very wonderful. A thing amazing! But before I could show it to anyone, the oxygen in our atmosphere burned it up. So when I recreate it now, I shall have to keep it in a vacuum."

"You have all the things necessary to recreate it?" Bartoh asked.

"Yes. The compounds that were in the meteorite—the fused metals—I have found how to separate them so that I can recreate the substance in its pure state. Breaking down the compounds. Discarding the unwanted ingredients until at last I have the orig-

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inal substance. I have done almost all that, already."

His eyes were sparkling as he thought of his coming triumph. He gestured toward the bubbling retorts, where the viscous fluids were giving off wisps of vapor that were like tiny dissipating ghosts on the pallid hydrogen light.

"I'm going to call the new substance Jonsite," the old man added. "Wait until you see how rich and famous scientists flock here to our little laboratory, with their eyes popping out in wonderment."

BARTOH sat very still and held his fingers from twitching.

"You will make it now, Master?"

"No, not now," Jons said. "But it's simple. I only have to sit here with my hand on that switch. Everything is ready for the final reaction. And that takes no more than a minute."

"There is no danger, touching that switch?" Bartoh forced his voice to be steady as he indicated the switch which was at the edge of the overhead shelf.

"Of course not," Jons said. "It merely opens a valve to let my final ingredient into those retorts. They're connected in series as you see. The argarite gas flows under pressure from one to the other of them. The whole thing is automatic. There is nothing to do but watch. The heat shuts off automatically. Liquid air cools the retorts. And in that big one, up there in the center of the row, my substance will congeal into its original pure state. A thing so amazing—"

"Let us do it now," Bartoh suggested. He moved a little on his stool.

"No," Jons said. "There is some apparatus—"

The words died in his throat. He saw the knife that suddenly was in Bartoh's hand.

"Why, good God, Bartoh!" he gasped.

The pallid light from the burning hydrogen torches glistened on the naked knife blade.

"Don't move," Bartoh said. "Don't speak. I'm going to tie you up—not kill you."

Not kill him until the thing from Mars was successfully created.

"Why, my God!"

Then the old man just sat, docile, panting, trembling, with his lips white in the pallid light and his eyes like the eyes of a trapped animal.

"That's better," Bartoh chuckled. "Keep quiet and I won't hurt you."

There was only the hissing of the hydrogen torches and the old man's terrified panting breath as Bartoh produced the lengths of annealed flexible copper wire and bound Jons into an inert bundle and laid him on the laboratory floor, over in the corner.

The row of hydrogen torches seemed to burn a little brighter as though with eagerness now to complete their tasks, while Bartoh sat on the stool where Jons had been, and flung the little switch. The whole intricate mechanism on the steel shelf was alive with activity. There was a hiss as the released purple gas—the final ingredient—came out of its pressure tank. Bartoh sat breathless, triumphant, peering at this magic of science of which now he was master.

The steel shelf was stretched against the wall, in front of him almost on a level with his eyes. He could see the purple gas, heavy and turgid as it welled up in the tiny glassite tube that led from the tank into the first of the boiling retorts on the shelf. The gas came up slowly. Then in the silence, as it went into the retort, there was a muttering rumble of bubbling, boiling viscosity.

The bound old man over on the floor in the corner was staring with eyes like a trapped animal. Bartoh flashed him a glance of triumph. Only a minute, Jons had said. A minute more, and then the thing from Mars would be created here, to be possessed by Bartoh—to bring him wealth and fame, making his name ring through the country as the great man who had produced something new.

THE link of transparent glassite tubing that connected the first with the second retort was growing turgid now. Vapors were swirling in it. The second retort was rumbling. Then the third, and the fourth. Until at last

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the bigger tube that circled back to the retort in the center of the shelf was dark with an incoming, inklike vapor, sucking in with a flow infinitely rapid.

The hydrogen torches under the retorts had one by one all been extinguished. But still there was a flame under the central, pot-bellied little cauldron. It was transparent. Within it Bartoh saw the gasses swirling above the viscous surface of a boiling fluid in its bottom. The fluid content was shrinking; the vapors were thinning, sucking down into the liquid.

Then abruptly the hydrogen flame under the retort was extinguished. There was a hissing swirl of ghostlike white fog, a spray of liquid air upon the retort. For a moment the breathless Bartoh could see nothing save that frigid fog. Then, as it dissipated, there was visible the thick, gray liquid which now was low in the bottom of the retort.

It was shrinking, congealing as it cooled. In another few seconds it was just a half-inch level of gray fluid, rapidly turning solid, gathering itself into a little ball.

"Bartoh! For God's sake, Bartoh, you don't understand—"

He hardly heard the old man's gasping voice. He peered breathlessly at this thing from Mars which was forming itself now before his eyes. The gray ball was no bigger than a walnut, then smaller—turning darker, glistening sleek as gray-black glass there in the bottom of the transparent retort.

"Bartoh, for God's sake! You—"

The retort, squat and solid on its short thick, steel legs, seemed trembling. The whole strong steel shelf seemed trembling—like Bartoh himself, trembling with triumph.

The ball, all in that second, was no bigger than a pea. Then in the silence of the breathless laboratory, the retort broke with a splintering crack as it tilted forward on its legs. Bartoh's heart leaped and stuck in his throat. But the precious thing from Mars was unharmed. It had rolled to the quivering steel shelf.

A little gray-black pea . . . It was slowly rolling forward . . . it would fall off the edge. . . .

"Bartoh!"

But Bartoh had the wits to save it. From where he was sitting on the stool he reached up. His fingers gripped the tiny gray-black pea. He was aware of his hand coming down with it, or his hand falling with the pea so that his hand struck his chest and he went backward and downward to the planking of the laboratory floor.

For Bartoh there was just a flash of wondering thought, too swift for horror, with a vast stabbing pain in his chest and a mingling chaos of splintering, cracking roar. Just for a split second as all his senses roared away into Eternity. . . .

"IT was terrible," old Jons was saying to the gathered group of newscasters, photographers and sound men who crowded the wrecked little laboratory. "I tried to warn him—it was all so quick. I was so terrified myself—"

They were all gazing at the splintered laboratory floor. Blood crimsoned the wreckage, but the broken body of the murderous Bartoh, with a hole through its chest, had been removed now.

The visitors were peering down through the little jagged rift of splintered board flooring into the littered room below.

"Great Heaven!" someone said. "There's another hole in the floor down there! Are you going to be able to find the damned little thing, Mr. Jons?"

"It oxidizes in the air, burns itself up within half an hour," the old man said. "I was going to keep it in a vacuum. I hadn't yet arranged any of the mechanism for handling it. That was a problem."

"But what was the thing?" one of the newscasters demanded. "I don't yet understand—"

"A new form of matter," Jons said. "A concentration of the atoms—an amazing concentration of atoms—with almost no space between them, packing themselves into the molecules."

The old chemist stood gazing at the awed group of men.

"That little pea weighed two tons," he said.

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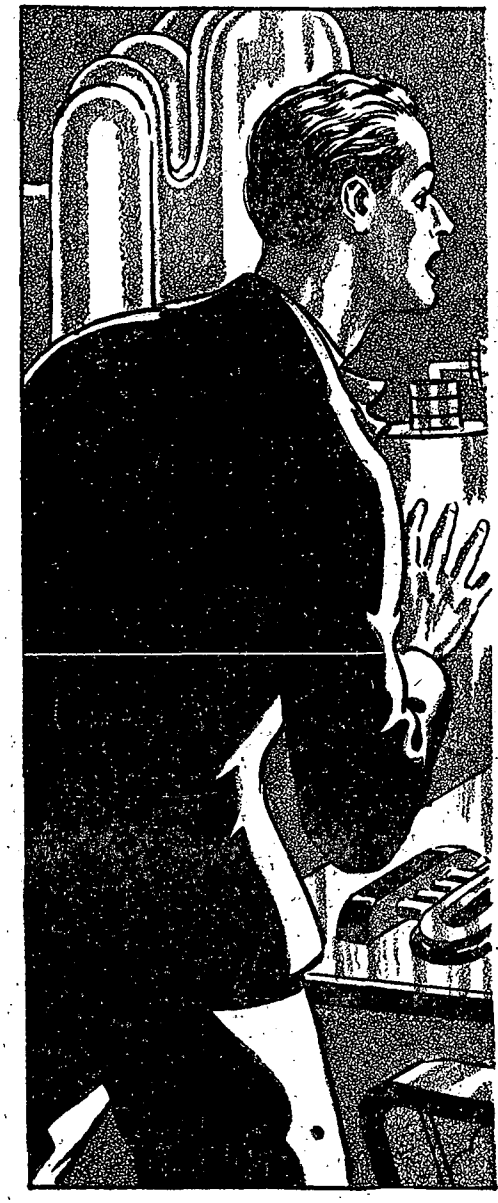
THE GREEN RAY

A Complete Novelet of the Future

By ARTHUR LEO ZAGAT

Author of "The Lanson Screen," "Cavern of the Shining Pool," etc.



The imaged plane

CHAPTER I

The Weapon

"YOU'VE been working too hard, Greg," Dean Thorkel, chief editor of New York *Newcast Central* said. "This Paris trip will set you on your feet."

Professor Gregory Vance stared at his friend out of glowing eyes.

"I'm not going to Paris, Dean," he said quietly. "Maybe by tomorrow I won't be able to go anywhere."

The atmosphere of the white-tiled laboratory was suddenly heatless with the chill of some brooding dread.

"Not going!" The newsman gasped. "Passing up the Einstein Award Convocation! Hell, man! When it was announced in nineteen ninety-six you told Cliff Hoskins and me you would devote your life to winning it. That's why you've been slaving here at National U. for seven years while I've been keeping an eye on seven seas and five continents, and Cliff's been risking his life in the Military Intelligence. You—"

"Risking his life." The words trickled from between the scientist's white lips. "Risking—" A sharp *burr* cut him off, the attention call of the wireless teleautograph in a corner of the lab. He twisted—and then his

Under the Curtain of the Aurora Borealis

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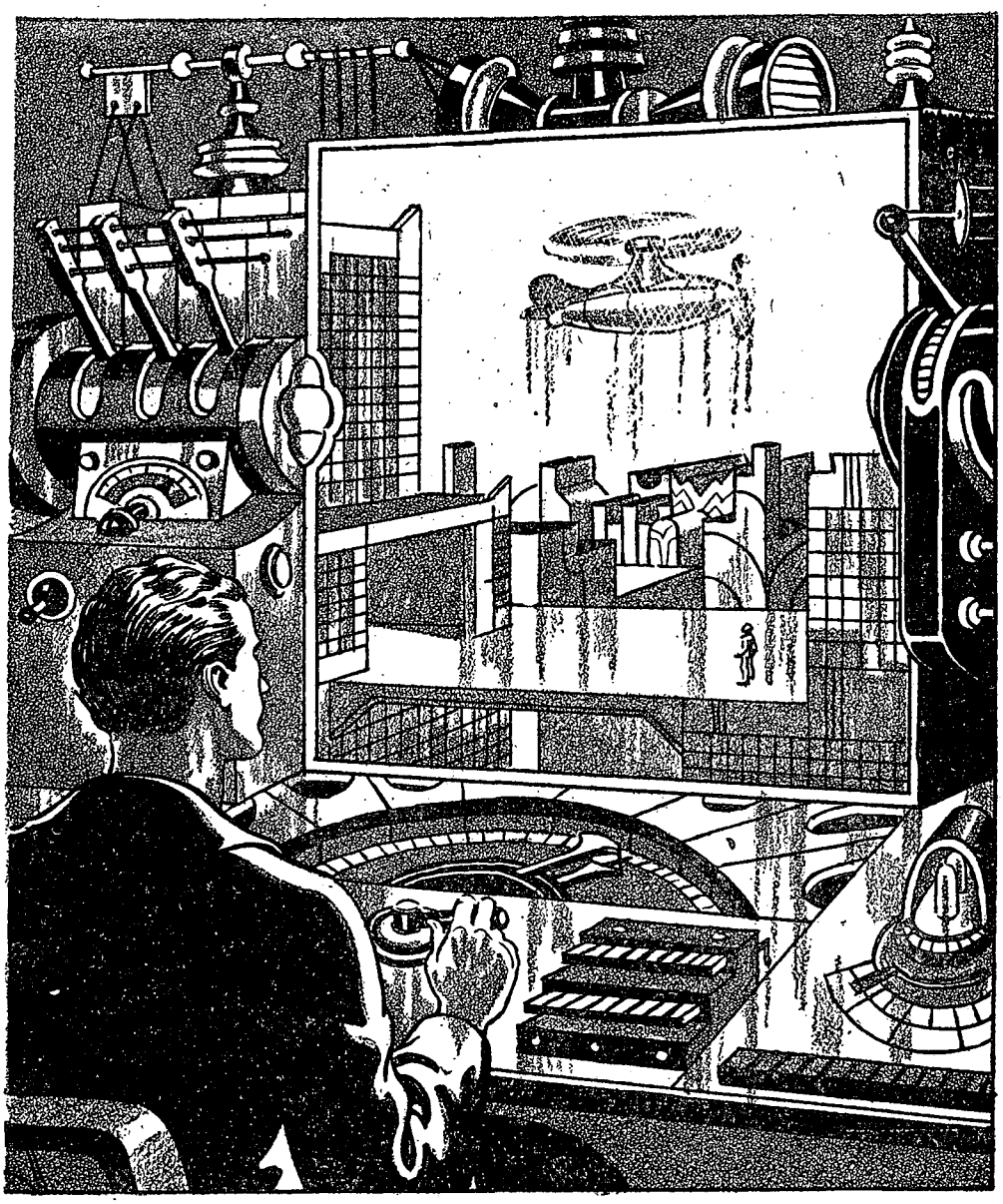

blurred as its vanes gathered speed

voice was a thin thread, wire-edged with terror. "There it is again!"

Thorkel leaped to the machine whose silver pencil danced eerily across white, unrolling paper. *"Vance!"* The salutation was abrupt. *"Final warning. You speak before you reach Paris, willingly or—unwillingly."*

The newsman, his massively sculptured countenance chalky, whirled to the disc of a verbal communications transmitter, but Vance's hand closed on his shoulder.

"No use, Dean," the physicist whispered. "I've tried to trace those messages before. He taps in from some unauthorized station of his own, and it can't be located."

Two Men Struggle for a Lethal Formula!

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"But—but—who—"

"Ho-Lung."

"Good Lord!" Thorkel breathed the exclamation. "He—"

Vance's thin lips quirked in a humorless smile.

"You've heard of him?"

"Who hasn't. He's the lone-wolf ace of the Asiatic Secret Service. He's got ears and eyes everywhere. He's killed more enemies of the Yellow Coalition than their armies. But no one knows who or what he is. Sometimes I think he's a myth. But you're no soldier or diplomat. What can he want of you?"

"Want of me?" Gregory Vance's slim white hands curled into curiously ineffectual looking fists. "I'll show you."

He moved to the lab table, lifted a cylindrical graduate from the stone slab of the laboratory table. From shelves on which hundreds of bottles were ranged, each labeled with a number only, he selected a half dozen vials. He carefully measured their contents into the etched glass until he had a liquid compound that was purplish and fuming. Somehow it seemed alive in the cold light of the beta-argon bulb in the ceiling.

The physicist picked up a lens-shaped but hollow crystal, dripped the solution he had concocted through a tiny opening until it filled the cavity. Then he fitted the lens he had made over the miniature bulb of an ordinary flashlight.

"Get down one of those cages with a white mouse in it, and place it on the table." Thorkel obeyed.

"Watch!"

Vance aimed the flashlight at the cage, pressed the button. A green beam flashed out, uncannily bright even in the mock daylight of the windowless room. It struck the mouse. An exclamation of horror escaped from the newsman.

An instant before the tiny animal had been there, instinct with life. Now—a glittering, viscid pool of iridescent oil glittered at the bottom of the cage!

THE virescent light clicked out. Vance extracted the lens that had converted an ordinary flashlight into an instrument of annihilation, smashed the glass in the sink, watched the purple liquid disappear, fuming, down the drain.

"Imagine searchlight beams fanning that green ray through the skies and over the seas, trapping the oncoming hosts of an enemy and melting them, melting human beings into oily nothingness as that mouse was melted.

"Imagine their rocket-ships dropping uncontrolled from the heavens, their surface craft colliding, sinking into a boiling sea. What price invasion then?

"And all that is needed to make the weapon ready is the compound to fill the hollow lenses. Every glass factory in the country is now busy casting for the searchlights with which our coasts are lined, for the aircraft beacons which dot the continent.

"But—but how can mere light produce such an effect?"

"It's simple. You know that matter is the result of a disturbance in the sub-ether, just as light is a vibration of the ether. And that ether and sub-ether are intimately interconnected. I have discovered a light vibration that steps up the vibrations of material atoms one micron. It transmutes elements, in other words. It acts only on organic matter, so far—transmutes the elements of any living body to others a little higher in the scale. And that—" Vance nodded at the oily pool that had been a living thing moments before—"is the result of the transmutation. Now do you know why Ho-Lung has been after me for weeks?"

"For weeks!" Thorkel exclaimed in surprise. "But—your life hasn't already been attempted. Surely I should have heard."

"No," the other replied. "He wants the secret for his country. The ray is as formidable a weapon of offense as of defense. His messages have taken me up on high mountains and offered me the earth and the fullness thereof. He has resorted to threats only in the past week, as I neared perfection."

"Neared perfection! It looks pretty damn perfect to me."

"The effects, yes. But adjustments are necessary so that the target of the ray may not be shielded. My ray will

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penetrate any material except a certain ferro-beryllium alloy. Unfortunately, that alloy is the very one used to armor the Oriental rocket ships. I am on the track of the solution. In a few days I hope to have it. Otherwise—the thing is useless."

"But the Army laboratories! Surely they must be helping you on this. You must have given them some idea of the thing, so that they should be able to proceed if anything should happen to you."

"No. The War Department has ordered the hollow lenses purely on blind faith in me. The basic principle of the ray is known by myself alone. Our service is honeycombed with spies.

"Cliff Hoskins flew in from Manchukuo six months ago. Just a week before that I had got in touch with the War Secretary and given him in strictest confidence the barest outline of what I was working on. Three days later, Hoskins, eavesdropping on a conference of the Asiatic General Staff, had heard a full report of every detail of my talk!"

"Then if you are killed the whole thing is lost."

"Wiped out!" Vance's hand erased a chalk mark on the table-top. "Like that. If they can get the formula from me, well and good. But as soon as they are convinced that I will not yield it to them they will make sure the American Government does not get it either. That is why I cannot go to Paris, why I must hide. I have a place prepared, and I can get there unobserved. I shall show you how later. There is only one chance in a hundred of their getting me, once I'm away, but I want to guard against that one chance."

VANCE pulled a paper from his pocket, handed it to Thorkel. The other saw figures at the top, map coordinates of some point in the Far North. Then there was a long line of curious symbols, symbols that were vaguely familiar.

"The location of my hiding place," Vance explained. "And the formula, in our old code."

Thorkel remembered. How clearly that brought back the old student days, when he, Greg, and Cliff Hoskins had been inseparable. Hoskins had been reading treatises on cryptography and had challenged the other two to devise a code he could not decipher. They had accepted, and won. Hoskins had accused them of being unfair when he learned that three keywords were necessary to the solution.

"The keywords are these." Vance wrote three words on a bit of paper, displayed them to Thorkel, then tore the scrap of paper into tiny fragments. "You know how much depends on the safety of that formula. If you don't hear from me within a week, take it to the Secretary of War—to no one else." Greg gripped Thorkel's arm, his fingers digging deep in emphasis. "Remember, Dean, give the formula to no one else, whoever he is, no matter what the circumstances."

Vance turned to the door.

"Now come out to the hangar with me and I shall show you how I shall get away, literally unseen."

CHAPTER II

The Stolen Cipher

DEAN THORKEL strode through the high-ceilinged dispatch room of New York *Newscast Central*, his heels clicking sharply on the rotunda's marble floor. He was oblivious of the intermingled voices of the announcers droning to a million listeners their running commentary on the televised picturing of world events. He climbed stairs to his bright metal desk atop a raised platform at the center of the hall. Beneath his chestnut thatch his brown eyes were almost black with foreboding.

"Good morning, Mr. Thorkel."

"Morning, Haley. How'd the night go?"

"Fairly smoothly, sir." Randall Haley, night editor, was short, emaciated, completely bald. His tiny eyes, uncannily bright behind slitted, lashless lids; his sharp, hooked nose, gave him the appearance of a bird—a vul-

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ture. "The Aurora Borealis is kicking up again and Transcontinental Air's Arctic refueling fields are cut off. But nothing ever happens up there."

"All right. I'll take over." Behind his expressionless features a band seemed to constrict about Thorkel's brain. The electrical disturbance might last for days. Suppose Greg wanted to communicate with him. . . . He grunted vaguely. Sinking into his swivel chair, he bent as if to fasten the lace of his shoe. There was the slither of steel on steel, barely perceptible. In a moment Vance's cryptic formula was safe in a secret drawer.

Thorkel straightened, switched the foot-square monitor screen before him to the wave-length of a newscopter that hovered above the hundred-story Science Tower of National University.

On the screen's shimmering surface a tiny figure emerged from the penthouse laboratory where, to quote the Einstein Award Citation, "science has leaped forward a century in five years." It moved to a blue, toylike one-man gyrocopter that had been rolled out of its hangar.

"Professor Vance is entering his 'copter, folks," the reporter's voice droned. "In seconds he will take off—"

"Mr. Dean Thorkel, I believe," suave tones drawled from the stairhead. Thorkel twisted around.

"Cliff Hoskins, you tramp," he roared, jumping up. "Where the hell did you drop from?"

The stocky, dark man in quiet gray came across the platform.

"Hell's right," he responded, low-toned. "I tried to get here in time to slap old Greg on the back before he left for Paris, but skin-friction held my rocket plane up and I'm too late. I—"

"You're just in time," Thorkel snapped. "He's taking off. Look." He turned back to the screen.

The imaged plane blurred as its vanes gathered speed. It lifted from the roof, gained altitude in vertical ascent——and vanished!

"My God!" the reporter cried. "That wasn't a static blot, folks. Professor Vance is—gone. Blotted out. I can't see his plane anywhere."

Low words thudded from Thorkel's lips. "It works. By all that's holy, it works!"

"What works, Dean?" Hoskins questioned. "What's happened to Greg?"

"He's skipped. He's putting himself out of harm's way until he finishes his job."

"So you know about that!" Cliff Hoskins slid the seat of his trousers onto the desktop. "Where did he go?"

"Sorry, Cliff. I can't tell even you."

"But you know. It's on something hidden in your desk." The Secret Service man grinned. "It's okay with me, Dean, but you want to be more careful. You looked down just then. That was a dead give away. An Asiatic spy would not have missed it."

THORKEL, startled, swiveled about to where Haley, behind him, was washing up. The little man's face was a mass of soap suds; he could have heard, seen, nothing.

"I've got about a half hour to chin with you," Hoskins said. "Then I've got to get back to Manchukuo. Big doings there."

For thirty minutes the Intelligence man told a rapt listener of an East buzzing with activity, of new explosives by the hundred thousand tons pouring from smoking factories, of vast arrays of rocket planes and hordes of surface-craft, of all the gigantic thunderbolt Asiatica was forging to launch at America, the only nation strong enough to resist the Mongolian dream of world domination.

"I tell you, Dean, we haven't a ghost of a show unless Greg comes through. Even then—" Hoskins shrugged. "But I've got to go." He rose, then paused. "Say—I may have to get in touch with you, in a hurry. How?"

Thorkel reached for a memorandum pad, jotted some numbers on it. "Here's the wave-length combo of my private line. I've just changed it. Greg's the only other who knows it. That'll be the safest for you to use."

Hoskins took the slip, studied it briefly.

"This may be foolish, but it's a habit," he said. He grinned, crumpled the memo into a ball and popped it into his mouth. Then, with an insouciant

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wave of the hand, he was gone, returning with a smile on his face to the alien land where death stalked always at his elbow.

"NO report on Professor Vance's whereabouts. . . . No trace has been found of Professor Gregory Vance." All the rest of that day, all the next morning, the recurring phrase from the busy operators pounded at Dean Thorkel, thumped into his brain. The total absence of news from Greg meant that his plan was working, that he was safe. But—

Mid-morning, a low, insistent *burr* pulled his eyes to the serried row of phonejacks on his desktop. A red glow showed above the furthest one on his private line. Only two men knew that combination. Greg! It must be Greg! Thorkel slammed on his headphones, jammed the dangling plug into its receptacle.

"Hello."

"Dean?" A flat voice, monotonous, unfamiliar. "Greg speaking. Greg Vance." It didn't sound like Greg. Thorkel jerked down two cupped discs from the headband across his skull, fitted them over his eyes.

"What's up?" It was Greg Vance. The visor eyepieces brought his image clearly, his high-domed head, the patch of premature gray at its temples. But —it must have been the effect of the Borealis—a greenish tinge filmed the televised face and the eyes seemed glazed, expressionless.

"Dean!" the unnatural voice whispered. "Come to me. I need—" A sudden shadow loomed behind Greg's head. It was gone. There was a thud in Thorkel's ears, the soft thud of a fallen body. Then—nothing.

Someone had found Greg! Some enemy. Thorkel ripped the headpiece away, crouched below the screen of his desk. He pulled out the lowermost drawer. His hand slid within it, pressed against the upper-edge of one side-piece, forced the apparently solid metal down and to the rear. The steel slid. Thorkel's fingers fumbled within the revealed cavity.

The concealed niche was empty. The paper that meant Vance's safety, the nation's safety, was gone.

Thorkel lunged to his feet, leaped the stairs to the floor below, ran in great, bounding strides to the exit. His 'copter was parked, sleekly yellow, in the open roof-square. In a few seconds he was in its driving seat.

Above, the traffic beam showed red, and a green police plane hovered watchfully. But Dean Thorkel thrust over the throttle, and the gyro shot up from its berth, zoomed through the thick cross-streams overhead.

Thorkel had a momentary glimpse of a white-faced pilot at the controls of a lumbering bus-flier as he shot across its prow. His stubby wings scraped a rusting flivver's wings. A woman's shrill scream came thinly up to him. The traffic cop's siren was in his ears and the green plane was diving for him.

A twisted grin relieved the grimness of Thorkel's face for an instant. His horizontal-flight propeller screamed as it bit the air. The yellow gyro darted north. The police boat banked and was after him. Dead ahead another green plane appeared, steadied, waited ominously.

On the dashboard before the newsman a foot-square metal box was fastened, crudely. Fine wires led from the box, and made a meshwork on all the outer surfaces of Thorkel's gyro.

"You may have to reach me unobserved," Greg Vance had said, when he had worked to install the queer contrivance. "This will enable you to do so, as it will enable me to slip away unseen."

The first police craft was overhauling Thorkel, was fifty yards behind. Its siren shrilled again, and a black, metallic tube snouted at him. Thorkel jabbed at a button on the front of the box.

TWO traffic officers rubbed amazed eyes, and looked again for the yellow gyro that had flicked into nonexistence between them. But there was nothing to be seen!

Everything outside his own little ship was nothingness to Thorkel's eyes. He was in a tiny world of his own, suspended in illimitable, empty space. Only sound beat in to him from

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the invisible world about him, the sough of the crowded air-lanes two thousand feet below, the muted roar of the great city still lower, the rattling thunder of the pursuer's prop, the police siren moaning into sudden silence.

On the fifteen thousand foot level, where chances of collision were at a minimum, Dean Thorkel drove on northward. Blind flying with a vengeance, this was, though broad daylight and an unclouded sky were all about him. For that same daylight was flowing *around* his gyro, the ether waves curved by the field of force the little box produced and the fine wires guided. No sight could come to Thorkel of things beyond that network, nor could anyone beyond that network see his plane. The light waves were warped.

"Good thing," Thorkel muttered, "that I've got a sound-wave robot pilot instead of the old style radio-reflector, or I'd sure be out of luck."

COLD crept into the yellow gyrocopter's cabin, cold that even the high altitude heat-coils could not combat. The position dot on the robot-pilot's map was close to the point where it became necessary for Thorkel to take over the manual control for the landing. He pressed a black button.

An illimitable expanse of snow and ice stretched desolate beneath him. Overhead the Aurora's macabre dance of sheeted light was eerie against night's black curtain. Far to the west an air-borne dot circled, minutely scarlet. Instinct, the call of kind to kind in the vast loneliness, told Dean Thorkel that this was a plane, man-guided. It faded into the lurid dance of the Northern Lights.

The automatic control relinquished the plane's guidance. Moments later, Dean Thorkel stumbled across tumbled blocks of ice. He passed a blue plane, frost-whitened, hidden beneath the overarch of a pressure-ridge. His breath fell in snow before his mouth, and each inhalation was an agony. The snow-hill just ahead was a house. Its outlines wavered as the icy fingers of a forty-below temperature twisted his brain. The shape of a door was vague in the ice-encrusted wall.

He forced a numbed hand to it. But the door opened before he touched it. A tall figure stood in the jagged rectangle. Its long face was a white, expressionless mask. Gregory Vance lifted an arm, jerkily, beckoned Thorkel in.

"Greg!" Thorkel's intended shout was a frozen whisper. "Greg! You're all right! I thought—" Thorkel went across the threshold, reached for the statuelike figure of his friend, touched its shoulder. Suddenly Vance crumpled, to the floor, slowly, horribly, as the man-form robots used in domestic service crumple when the power-cast fails.

"Greg!" Dead eyes stared up at Thorkel. Just beneath the hairline a threadlike scar circled, crimson on the gray-white forehead. Thorkel peered closer—

"Freeze. And keep your hands away from your body!" Dean Thorkel twisted to the sharp command behind him. He saw a squat apparition, formless in a loose black robe; the head a faceless black globe, a black-gloved hand thrusting at him the blued steel of a forty-shot Trinite gun. Thorkel stiffened, his arms grotesquely out from his body.

The voice came again through the swathings, flat, colorless.

"You are Dean Thorkel." It was not a question, it was a statement.

Eyes glittered through holes in the ebon fabric. The black figure was ten feet away. It was useless to attack him. Before Thorkel could possibly close with him the tiny Trinite projectiles from his gun would tear into the American, would explode, and he would be spattered flesh.

"Yes, I'm Thorkel. What do you want?"

"The keywords of the cipher Vance left with you."

Then the formula was safe! The cipher was unreadable without the keywords. Thorkel shook his head, wordlessly.

The flat, cold voice was brittle.

"It will be better for you to give it to me willingly. I shall have it from you —be assured of that. And the process

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will not be—pleasant."

Torture! The Mongols were adepts at it. But torture could not make a dead man talk! Thorkel's knees dipped, his hands fisted. He sprang—straight at the pointing gun!

Something caught his ankles, tripped him. Amazingly, Vance's body jerked toward him, headfirst across the floor! Thorkel fell—

CHAPTER III

Vance's Corpse

THE newsman lifted slowly back to consciousness through a weltering purple darkness that was thick about him. His head pumped pain against a thin band tight around his skull. Fingers fumbled at his brow. His eyes opened. A black-swathed head floated before them, and glittering pupils in which glinted green flecks of light peered at him. A relentless, unhuman voice beat against his dulled ears.

"What is the code?"

Thorkel's lips tasted salty blood. But he forced words through them.

"No!"

The black head drifted upward as the Oriental straightened. The gun was gone from his hand, but there was something else in it, something metallic from which wires trailed. One filament came down to Thorkel's head, the other disappeared within the spy's robe.

The gloved hand twisted at that which it held. Fire bound Dean Thorkel's head in agony. Fire ran, a searing flood, through his veins. Sight, hearing, were gone. Feeling alone was left as every cell of his body quivered in anguish.

Then the fire died, and he was a limp, helpless mass on the floor.

"What is the keyword to the cipher?" Cold, pitiless, the inexorable question came down to him from the masked figure.

There was no escape, no hope of rescue. Greg Vance had chosen this location because of its isolation, its loneliness. Eventually human endurance would crumple and Thorkel would be compelled to divulge the keywords. Yet Thorkel still could say, through gritted teeth, "No, you scum," and gather himself to withstand the return of hell.

It didn't come. The spy twisted to a frost-hazed window. The stutter of a descending plane was muffled by thick walls. The masked torturer bent to his victim, twitched the wire off. An inner door closed behind his retreating form.

The front door shoved in before the rush of bulked bodies.

"What's going on in here? What's all the delay?" Two men, formless in heavy furs, were inside the room. There were Trinite guns in their mitted hands. There were red tabs on their shoulders, the badges of the Northwest Flying Police!

"He's inside," Thorkel gasped. "The killer's in there!" He poked a shaking hand at the inner door.

The Flyies whirled.

"Come on, Connors," one yelled, "McKraken's inside!" The two made a diving rush across the floor, were in the other room.

A wave of nausea rose, engulfed Dean Thorkel in a dizzy whirlpool. Air! He had to have air! He fumbled through the door, reeling. Intense cold struck at him, froze the mists from his brain. He saw a black shape flitting across the ice, saw it vanish behind a hummock. The slayer was escaping! He must—

Iron fingers gripped his arm, hauled him back into the house. A gun snouted in his face. "Not so fast, you!"

"He got out," Thorkel yammered. "He's getting away! Quick—you can still catch him!"

The Flyie's reply was heavy with sarcasm.

"Oh yeah! We'll chase shadows outside while you beat it. Say, we cops may be dumb, guy, but we don't fall for the same stunt twice. Stick 'em up!"

"Hey, Daniels!" The one called Connors was standing over Greg's body. He had a paper in his hand. "Guess who this stiff is! It's that Professor Vance—missing since Monday. This 'tele' picture's kind of blurred, but it's him all right."

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DANIELS swore picturesquely.

"An' this is the bird that killed him. Well, Connors, that McKraken's slipped us, but we've made a damn sight better catch. Here's where we get our stripes." Steel cuffs clicked over Thorkel's wrists.

"You're making a terrible mistake," the newsman protested. "The murderer is escaping while—"

"Sure it's terrible—for you," the officer scoffed, heavily humorous. "I'll say you're running in tough luck. Here we're out hunting a mechanic from Z40 refueling field that's stabbed his boss. We see your gyro's down here, think it's the yellow boat he took to make his getaway, and come busting in—just in time to spoil your little party."

"I tell you I'm not the murderer," Thorkel pleaded. "The real killer is escaping, while you're fooling around with me. Vance got a call for help through to me—I'm chief editor of New York *Newscast Central*—and I reached here just too late. Vance opened the door for me. He dropped just as I got in. It was that close. The killer jumped me and—"

"That's all wet," drawled Connors, kneeling to examine the dead Vance. "This corpse is stiffer than a poker—he's been dead at least twelve hours."

Hysteria edged Thorkel's cry.

"But he talked to me not an hour ago. I saw him—"

The policeman's big hand flicked out, slapped stingingly against his mouth. "Cut the fairy tales, you." He shoved the bewildered man roughly into a chair, snapped another handcuff around one ankle and a chair-leg. "Let's take a look at the body."

Thorkel buried his face in his linked hands. An hour ago Vance had called for help on the wave-lengths. Only Vance and Cliff Hoskins knew how to compose the combination of his private line. Minutes ago Vance had welcomed him at the door of his retreat. Now he was dead and the Flying Policeman, trained to determinations of that nature, his opinion not to be disputed, had pronounced the scientist to have been lifeless for twelve hours at least!

Talk penetrated.

"Man, look at this! What the hell has this bird been up to?" The prisoner lifted his head, saw that Greg's body had been turned over on its face, saw Connors pointing to wires that coiled out of two tiny holes in the center of a shaved patch at the back of Vance's head. They trailed across the floor and were kinked where Thorkel's feet had caught in them in his mad, sacrificial rush at the black-swathed figure!

"We'd better send in a report, before we investigate further," Connors was saying as Thorkel's eyes clung bewilderedly to the metal threads. "Looks like the Borealis has quit. We ought to get the captain up here."

"Check! There's a communication set in the other room. And say, confirm this lad's claim that he is editor of New York *Newscast*." Connors went out, and his partner turned to the prisoner.

"What's the idea of the wires?"

"I don't know anything about them. Look here—" The policeman jerked about, his Trinite gun suddenly in his hand. The outer door was slowly opening! Thorkel went rigid in his chair, expecting again the squat, jet-draped torturer. The one who strode in, though short, was a fur-clad bulk. Thorkel glimpsed his face. An incredulous shout leaped to his lips—"Cliff!"

Daniels' gun stabbed.

"Hands up, you! Up high!"

CLIFF HOSKINS' arms reached ceilingward, but his voice was unperturbed. "Hello, Dean. Glad you, at least, are safe." His calm tone steadied Thorkel, he was no longer friendless in an inimical world.

The police officer advanced threateningly.

"One of his gang, eh." His voice rose. "Connors! Oh, Joe! Come in here. There's another baby just popped in. Come in here and put the bracelets on him."

"No, cop. You're not putting any bracelets on me. On the contrary, you're taking them off Dean Thorkel, here."

Daniels' jaw thrust out, and his eyes slitted. "Oh yeah? Mighty sure of yourself, aren't you? Who the blazes do you think you are?"

"Lieutenant Hoskins, of the Army

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Intelligence Service. On special duty."

"More fairy stories! You birds sure tell them high, wide, and handsome."

"That will be enough low comedy from you. Take my thumbprints, check them with Headquarters." Authority snapped in Hoskins' voice. "Be quick about it too, if you want to save your jobs."

The flying policeman's tone was sullen as he saw credit for an important capture slipping from him.

"All right. All right. I'll check your thumbprints. But there's no need to get shirty. I'm just doing my duty."

"Right. But try to do it less unpleasantly." The thumbprinting was quickly accomplished, and Connors retreated to the televisophone. Daniels permitted Hoskins to lower his arms, but watched him wearily. Hoskins ignored him, spoke to Thorkel in low tones.

"We'll have you out of those as soon as the checkup comes through. I got wind of what was going on up here only a couple of hours ago, and I sure burned the stratosphere getting here from Harbin. Just what has happened?"

Thorkel's words tumbled over each other. Hoskins' face was expressionless, but his eyes grew granite-hard. "I can't figure it out at all," Thorkel ended. "There's something wrong, somewhere."

"Greg was already dead when you got the first message." Hoskins stated that humorlessly.

"Huh!"

"I'm not spoofing. The tip I got in Harbin gave me the picture. The Oriental spy reached here yesterday and tortured Vance to get the formula. Greg's leaky heart gave way. The spy had the cipher, but he had to get you up here to read it. He posed Greg's body in front of the visophone tube-eye and spoke from some hiding place nearby. The corpse started to topple, he had to pull the connection in a hurry. But he'd got what he wanted across."

Thorkel objected, almost pleadingly. "But Greg opened the door for me. He motioned me in."

"That's the meaning of those wires. The Asiatic scientists have found that by applying an electric current of a certain intensity to the proper brain areas they can produce muscular reactions in a dead body similar to those the same areas controlled in life. It is merely a refinement of the ancient experiment of making a dead frog kick by electrifying the muscles themselves. You disturbed the adjustment when you touched Greg, and he dropped."

"He's Hoskins, all right." Connors' reentry cut the friends' colloquy short. "And H. Q. says we are to obey his orders to the letter."

DANIELS flushed brick red.

"I'm sorry, Lieutenant," he stammered, "but I—"

"Forget it!" the Intelligence Man interrupted. "Unlock those cuffs. Then get out in your plane and scout for the killer."

As the door closed behind the cops Hoskins swung back to Thorkel.

"But they haven't the ghost of a show," the latter said. "The spy is halfway back to Manchukuo."

Hoskins shook his head.

"He must be hanging around. As long as you're alive with the key to that formula he won't give up. That's why I sent the cops away. I'm sure he couldn't have spotted my arrival. He'll figure you've been left alone here, and return. We'll be ready for him this time. He's a sly fox, and we've got to be careful how we bait the trap. The stage must be set just right. Let's see—" Hoskins' eyes were glowing with a strange light. "Get back in that chair and play 'possum. I'll hide in the other room."

Thorkel sprawled in the chair, his head lolling.

"How's that?"

"Great! But keep your eyes closed. And—I almost forgot! You had better give me the keywords to the cipher in case anything goes wrong. He may get one of us."

"The keywords are—" Thorkel cut off. Greg's unclosed, dead eyes seemed eerily to signal a message to him. Words echoed within his brain. 'Remember—give the formula to no one else, whoever he is, no matter what the circumstances.' Perhaps I had bet-

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ter not, Cliff," he said slowly. "Greg enjoined me to give the secret only to the Secretary of War, no matter what happened. I've a queer feeling that I should not disobey him."

Hoskins' black eyes blazed sudden wrath. Then, with a visible effort, he was smiling.

"Don't be a fool, old man. Greg could not have foreseen our present predicament. Besides, you know damn well that he would have entrusted the cipher to me, had I been available. He told me his plans months ago."

"You're right, Cliff. I'm a superstitious ass. The words are—" There was a jarring thud against the door, and sounds of a scuffle. A blast of cold swept in a struggling group. The two Flyies were back, and between them—Dean grunted in astonishment—between them was the wizened form of —Randall Haley!

Hoskins' words were thick with inexplicable fury!

"What's this?"

Daniels saluted.

"We spotted this guy going like blazes in one of them new one-man rocket planes, but we couldn't get within two hundred miles of his speed. He landed about a quarter-mile from here, concealed his plane and sneaked right up to this house. He was trying to listen at the door when we jumped him!"

CHAPTER IV

Ho-Lung Unmasked

THORKEL stared at his assistant. Haley must have stolen the formula, must have known that he held the key. The damning facts tumbled into his brain chaotically. Information came to the *Newscast* editors' desks that was often suppressed—for the nation's good.

Haley's newscard would admit him where the general public was barred! Then Randall Haley was the Asiatic spy—Ho-Lung! He had returned to complete his crime, just as Cliff had predicted. Dean Thorkel leaped to his feet, flung out an accusing arm.

"Haley," he shouted. "Where's that paper? Where's the paper with the formula of the green ray?" His face was livid.

The little assistant editor appeared dazed. He retreated before Thorkel's fury, despite the Flyie's grasp on his arm.

"I don't understand, Mr. Thorkel," he twittered. "I—I came up here to get you out of trouble—to identify you. What—what paper are you talking about?"

"That acting won't get you anything, Haley, or Ho-Lung. You've got away with it for twenty years, but the game's up. You know what paper I mean; the paper you stole from my desk." Thorkel advanced on the man. Haley was against the wall, one foot was lifting, slowly, its sole scraping against the plaster. His lips trembled pathetically.

"—I don't know to what you refer. But—but if anything is missing from your desk, perhaps Mr. Hoskins can tell you about it. He looked through its drawers last night—said that you had sent him for something. I knew he was your friend and permitted it."

Thorkel thrust his face close to the birdlike countenance. "You lie, damn you."

"The whole night force will bear me out. Visophone them and ask."

There was ludicrous dignity in Haley's refutation, the ring of truth in his statement. Dean Thorkel wheeled to Hoskins, who had drawn a little apart. The chair was between, and Thorkel caught at it.

"What about it, Cliff?"

A faint sneer lifted the Secret Service man's lip. His hand hovered very close to the butt of his holstered gun. "He's just playing for time, Dean."

For an instant Thorkel was irresolute, then something snapped in his brain. The holes in Hoskins' smoothly spun story were suddenly caverns to his sharpened perception. His fingers flattened against the metal of the chair.

"Maybe," he barked, "maybe you're right. You're so damn pat with your explanations of everything, suppose you explain a few more things. For instance, how you got here right on the

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spot, moments after the spy escaped, without the Flyies' having seen your plane. Why you were so all-fired anxious to get the keywords of the cipher out of me as soon as they were gone. And how it happened—I was a fool not to see it sooner—how on earth it happened that the faked call came in on my private line, the wave-length combination of which was known only to Greg, who was dead, *and to you!*"

Hoskins' glance flicked past Thorkel. His gun leaped from its holder. His eyes were twin pinpoints of menace.

"I'll explain, Thorkel," his voice rang out. "And if anyone so much as twitches a finger I'll explain with Trinite spray. *I am Ho-Lung!* Vance escaped me when his heart gave way, but I'll get the formula from you, and all hell won't stop me!"

DEATH vibrated in the room's stunned silence. Hoskins — Ho-Lung—crouched, his lips retracted from white teeth. From the corner of his eye Thorkel saw Daniels leap to one side, hunting the shelter of a cupboard, dragging at his weapon. Blue flame darted from Hoskins' gun—once—twice—there was the spatter of pellets striking their target—and the flesh-muffled roar of the Trinite blast. The room rocked beneath Thorkel, and a warm liquid splashed across his face to haze his vision with a red mist.

As if of their own accord his hands jerked up the chair they grasped, hurled it at the momentarily distracted spy. Then he was off his feet, catapulting in its wake. *Crack!* The renegade's face squashed under the newsman's fist. *Crack!* Another hammer blow struck home. Hoskins was down, Thorkel swarming atop him.

He heard a faint cry —"Stop, Dean, stop it!"—but his hands were clamped about a soft throat, and berserk fury made his fingers a tightening vise.

Hands were pulling at Thorkel.

"Let up! Let go! Killing's too good for him," someone was shouting. He surged to his feet.

Daniels, white-faced, leaned against the wall. His left hand was gripped tightly about his right. He stared dazedly at a pool of blood on the floor, a pool fed by a diminishing stream from Haley's shattered, legless torso.

Suddenly the shambles disappeared from Dean Thorkel's consciousness. He darted to the body, jerked at a bit of black fabric protruding from the rags that had been his assistant's fur coat.

From his nerveless hand a black robe hung sleazily, and a long black bandage through which two eye-holes had been cut! Thorkel stooped again. His fingers, searching, encountered wires, a Trinite gun. Then paper rustled. He started at cryptic symbols that danced before his eyes, symbols in Greg Vance's familiar handwriting. It was the cipher—the cipher that held a nation's safety! The proof was complete. It was Randall Haley who had stolen the formula, Randall Haley who was the torturer! Then—what about Cliff Hoskins?

"God, Dean, you've got the kick of a mule," the self-convicted traitor mumbled, painfully lifting himself to a sitting posture, his mauled features twisting into a battered grin.

Thorkel held the disguise out toward Hoskins. "Then—then you are not Ho-Lung," he stammered.

Hoskins' grin became more pronounced. He wiped blood from his mouth.

"Oh yes, I am Ho-Lung," he said calmly. "I didn't lie."

"But—but—"

Hoskins laughed.

"It's a bit complicated. I am Ho-Lung, one of Asiatica's most famous spies, and yet I am not a renegade to the white race, nor a traitor to the American Intelligence Service."

Thorkel's expression of dazed perplexity was pitiful. "I don't understand."

"I don't blame you. I was born in Asiatica, the son of American missionaries who were both killed in an accident soon afterward. I was adopted by Ho-Chien, an Asiatic high in the Secret Service of that country. He sent me to America to study, with the very brilliant idea that close acquaintance with our country's ways and customs would make me a most efficient spy indeed.

"What Ho-Chien did not count on

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was the call of my own people. At the University I realized that I was an American, a white. I realized that I could be of tremendous service to this country by pretending to continue to play the part of an Asiatic spy, while being in actuality a member of the American Intelligence Service. I told Ho-Chien that I was doing to America what I was actually doing to the Asiatics, that I was acting as a member of the American Service in order to further my work for the Easterners."

"But you—Ho-Lung—are notorious as a shrewd, cruel spy. The exploits with which Ho-Lung has been credited—"

HOSKINS chuckled.

"Yes, I have built up quite a reputation for Ho-Lung, so much so that he has become a legend of terror. That, I imagine, is why Haley signed that name to his communications threatening Greg. And it was a sort of poetic justice. For the way Ho-Lung got his reputation was by stealing credit for the work of others.

"You see, the Oriental Service is so managed that no one agent is known to another. Each works independently, getting what aid he can manage if he needs help. It was easy, then, for me to drop hints that this, that, or the other deed was mine, careful hints that spread in just the right quarters. Of course, every so often I did turn in real information, obsolete plans of fortifications, specifications of armaments carefully altered so that they were useless, names of American spies whom I knew had already been discovered, or were in a place of safety.

"There was one operative, somewhere in America, who was particularly successful, and whose identity I could not ascertain. It was he who turned up what Greg Vance was doing, he who had charge of the operations in connection therewith."

"Randall Haley!"

"Randall Haley. He got the wavelength combination of your private line by the old device of a waxed sheet hidden in the memo pad on which you jotted it for me."

"But why did you denounce yourself as Ho-Lung?"

"Because if I hadn't we'd all be shreds of pulped flesh now, blown to bits. I wondered why Haley shrank against the wall, why his foot was lifting, scraping against it. And then I saw a tiny bit of metal, there, that fine wire running out through the door-edge." Hoskins pointed at it.

"I guessed what he was up to. The current he used for the torture wire came from a small but powerful battery concealed in his clothing, the circuit grounded through the sole-nails in his shoe. If Asiatica could not have the formula, he was determined no one should. If the contact in his shoe ever reached that wire, a spark would have set off a Trinite bomb he had previously buried beneath the ice just outside.

"My claim to be Ho-Lung confused him just long enough for me to get my gun out. The cop grabbed for his own gun. I had to shoot the gun out of his hands to save myself, and all of us. But I got Haley!"

"Great work," Thorkel exclaimed. "Yet Haley won anyway. We're alive and we've got the formula. But Vance is dead, and it will never be completed now."

"I wonder. What's on that other slip of paper? It fell out when you pulled the formula from the dead man's clothing. You were too excited to notice it."

THORKEL looked where his friend pointed. Then he snatched the bloody slip of paper up. Words were scrawled on it, five words that changed the history of the world.

"Increase third acid by 1.2%."

Dean Thorkel's voice dripped into the cold.

"Greg's handwriting. He finished it. He finished the formula." Thorkel pulled a sleeve across his forehead, clearing away a vision of blazing homes, of a yellow swarm pouring over a fair, happy land. "Let's get going to Washington, Cliff. They're waiting for the green ray."

Cliff Hoskins stuck out a big paw.

"Go ahead, old man," he rumbled. "I've got to get back to Manchukuo. There's work waiting for me there."

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Alone on a Satellite of Doom, a Brave Band of Men Participate in a Grim Cosmic Drama!

We scudded down in a large smooth plain of cheeselike pumice stone

VIA DEATH

By GORDON A. GILES

Author of "Via Etherline," "Via Asteroid," etc.

HELLO Earth!

Martian Expedition Number One resuming contact via etherline radio. Operator Gillway speaking.

Eight hundred and forty-seventh day since leaving Earth at last opposition. Forty-first day since leaving Mars. Batteries only at half-charge, since the sun-power mirror needs polishing, but presume this is going through to you as we are now within a half million miles of Earth.

Please give return call immediately, acknowledging contact. Standing by. . . .

. . . Okay! Needless to say, we are glad to hear that a rescue ship is in readiness. We will undoubtedly have to land on the moon. Our fuel supply will be barely enough, Markers says, to brake against the moon's small gravitation. Landing on Earth, we would not be able to reduce speed safely and would probably burn up in the atmosphere.

But believe me, we are happy to be once again near the Earth-Moon sys-

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tem, which is like home after our sojourn out Mars-way for over two years. Too bad Cruishank, Proosett and Alado can't be with us. But they lie buried under the golden sands of Mars—martyrs to this venture.

We do not regret our adventure in the least. It has been a thrilling experience. We have viewed the hills and deserts of another world. We have seen alien creatures of another evolution. We have battled giant three-foot ant-creatures. We have discovered pictures and records of a dead civilization, mysteriously linked with Earth's past.

Yet the grandest moment of all came just yesterday, when Earth changed from a star to a small disc. *Home!* That was the simple, humble word that made us all choke when Dordeaux said it aloud. A moment later he wept unashamedly, but no one blamed him. I don't think any of us were dry-eyed.

To recapitulate briefly: The asteroid Anteros, with its eccentric orbit, carried us faithfully from Mars' orbit toward Earth's in thirty-four days, as Markers calculated. We owe that tiny body a deep vote of thanks. Our limited fuel supply would not have been able to carry us across that forty-million-mile gulf in less than a year.

Will resume tomorrow; batteries low. Music would be much appreciated, if you can supply us.

EIGHT hundred and forty-eighth day.

All went well during the trip, though once our gyroscope stopped and we wobbled dangerously close to Anteros' flinty surface before the mechanism could be fixed. We then resumed our short orbit around the asteroid, as its satellite.

We had a narrow escape yesterday when we prepared to tear away from Anteros' gravity. Suddenly, our rockets went dead. It was imperative that we break immediately away from the asteroid's gravitational grip—else it would carry us past Moon and Earth and sweep us outward again!

We went over the engines like maniacs. Parletti finally noticed that the fuel line was clogged. We had a laugh over that, for Parletti is a geologist and doesn't know much about engines. The line fixed, our rockets easily floated us away from Anteros. We gave that little planetoid nomad of the void a rousing cheer as it receded.

But here we are, approaching the moon's orbit at five miles a second. The moon, in turn, is bearing down toward our position at nine miles a second. It will take some neat figuring to escape a crash. Markers and Captain Atwell have worked forty hours consecutively on the computations. Because our coffee supply is exhausted, they take a swig of pure oxygen now and then as a stimulant.

We are now the same distance from Luna as Earth is, but on the other side. We have been examining this mysterious Other Side, that Earth never sees, with our telescope. It looks no different from the Earth-side, with the usual craters, broad plains and sharp-edged mountain ranges. Naturally, one could not expect it to be different.

Power fading; *au revoir* till tomorrow.

* * * * *

Eight hundred and forty-ninth day.

Urgent!

Send the rescue ship immediately and have its radio open for our call.

A rather grave situation faces us. Originally, we had planned to land somewhere on the Earth-side, noting the approximate location according to the standard Lunar map. This would have simplified the rescue ship's task of finding us.

But now, checking and rechecking the figures without avail, Captain Atwell announces that we must make a forced landing on the Other Side!

Our approach, of course, had been from Mars, toward the Other Side. Atwell had hoped to circle the moon halfway around with our momentum and land on Earth's side. But due to adverse factors of orbits and speeds, this might result in a bad crash. Our only hope, it seems, is to bear down obliquely on the Other Side, take up the proper tangent, and brake with our last bit of fuel for a landing there.

We are now about ten thousand miles from the moon. We will land

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within the next twelve hours. Swinerton is rapidly sketching in a general map of the Other Side. We will try to land in some wide, open space, in direct sunlight, and note the nearby landmarks. This will make it simpler for that rescue ship to find us.

Must stop now. If our luck holds out, and we make a successful landing, we will contact the rescue ship immediately afterward.

EIGHT hundred and fiftieth day. Successful landing!

Martian Expedition Number One contacting the rescue ship. Received your call a few minutes ago. Captain Atwell sends his grateful thanks to your Captain Macklyn, his old friend, for his encouraging words—"We'll find you if it takes a year!"

Our landing was fortunate. We scudded down in a large, smooth plain of cheeselike pumice stone. We missed a mountain peak by millimeters. The rear part of the hull sprung a small leak from the strain of the landing. Greaves agilely slapped a rubber patch over the slit before the air-pressure had dropped to half normal. All of us have bruises. Markers was knocked unconscious against the wall, and Dordeaux has a broken arm. Parletti already has it set and in splints.

Now we come to your problem of finding us. Frankly, it will be a task. We realize our chances are pretty slight. We are in a vast territory unidentifiable to either of us by definite landmarks. Your party must somehow locate our tiny speck of a ship in hundreds of square miles of limitless, jumbled topography.

We will try to guide you as best we can. Fortunately, the stars shine with the sun in this Lunar sky, making observations of positions possible. Markers has computed, as nearly as he can, that we are about thirty-one degrees from the western edge of the known Earth-side. And about seventeen degrees from the Lunar north pole.

Going by Swinerton's sketch, the plateau we've landed on seems to be bordered a few miles west by a long range of mountains which run north and south. We can see their ragged peaks outlined against the stars. Just to the south of us, about five miles distant, is the rim of a crater that is probably fifty miles in diameter. This crater forms a triangle with two other large craters further east. From the glimpses we had while descending, the line of bisection of the base-line opposite the nearest crater, extended through the latter, points almost directly toward us.

Captain Atwell has thought of a way of indicating our position. He has just sent Greaves out in an air-helmet with our one remaining seleno-cell. Greaves placed it about three hundred yards from our ship. As soon as its charge builds up from the strong sunlight, it should start shooting out fat sparks, similar to those that killed the ants on Mars. There is just enough vapor-pressure here on the moon's surface to duplicate the interior of a vacuum-tube, to carry the charge and ground it into the rock.

These sparks—there goes one now—are an intense bluish in color and will be outlined strongly against the white plateau floor. You should be able to recognize them easily.

That is about all we can do. The rest is up to you.

And now something very vital. Markers has also calculated that the slow but certain Lunar-nightline is descending upon us. We have something like thirty hours of daylight left and then we will be engulfed in the total blackness of the moon's long night of two weeks. Searching activities would be impossible during that time.

Since it is doubtful if our air supply would last that length of time, we can only hope that you will locate us in the next thirty hours.

I will keep in direct touch with you beginning in an hour, after I have gone outside the ship in an air-helmet and polished the sun-power mirror.

By the way, Greaves' venture out has settled a long disputed question among scientists—as to whether a person would freeze quickly in the near-vacuum of space. Greaves was out for an hour, heavily bundled. He says he felt warmer than on Mars with its atmosphere. Evidently, the conduction-

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loss of body heat in a cold atmosphere is greater than the radiation-loss in a vacuum.

Our morale is high. We are sure you will find us soon. We are looking forward to our arrival on Earth.

EIGHT HUNDRED and fifty-first day. (1 A. M.)

Captain Atwell to Captain Macklyn. Buck up, old boy! You must not condemn yourself so bitterly for not finding us in these last ten hours of search. You are searching a world, man! An unknown world. We know you are doing your best. We can ask no more.

Gillway speaking. The long narrow shadow of the nearest mountain peak crawls slowly along, but we are all in good spirits. The moon is an interesting, if cheerless, place.

Greaves, examining closely the shavings of pumicelike stone through which our ship plowed, announces that it is impregnated with silver. So the proverbial linking of Luna with argentum is not so far-fetched after all.

Parletti has examined the surrounding formations with the telescope. He has devised a complete crater-theory from the one we can see—a crater that shows signs of having been *eaten out!* With an amused smile that covers a serious meaning, he suggests that long ages ago the moon had an acidic atmosphere. This condensed gradually, forming pools all over the moon's surface. The pools steadily ate their way down into the rock.

Markers has sketched the sun's corona and halo a dozen times, as it subtly changes from hour to hour. He predicts that when interplanetary travel passes into an active stage, the moon will quickly be equipped with a great astronomical observatory. A telescope on the moon has twice the effectiveness of one on Earth because of perfect visibility.

The nearest mountain looks scalable. It is about two miles high. It has unweathered outcroppings that form a regular series of giant steps to the peak. Swinerton, whose hobby on Earth was mountain-climbing, says he could negotiate it in twelve hours. I wouldn't doubt it, in this ridiculously light gravitation. Greaves can jump twenty feet high without effort.

Though slightly feverish from his broken arm, Dordeaux induced the others into singing. It helps relieve our nerves. They are singing *Tipperary* now. "There's a long, long trail a-winding—"

* * * * *

Eight hundred and fifty-first day. (11 A. M.)

Only six more hours of daylight left!

We realize the difficulties facing you in locating us. We can't seem to hit a mutually recognizable landmark or topographical formation. We don't remember the two mountain ranges forming a cross that you mention. Perhaps you are still too far west of us. Are you certain that you can't make out three large craters forming a triangle? It is very definite here on Swinerton's map.

I thought perhaps I could tell you when you were drawing near by watching for an increasing strength of your radio signal, but I haven't noticed a bit of variation. I surmise from that that you are still a considerable distance away. I think I know why your attempts to locate my transmitter at the bisection of two or three beam-lines failed. I've been getting echoes from all directions. The mountains must be loaded with magnetized metals.

Markers has checked the longitude again; it still comes out close to thirty degrees west. Assuming an error of five per cent at the most, we are within thirty miles to the east or west of that position. Similarly, we are within thirty miles to the north or south of our computed latitude. So we have hopes that you will find us yet, though you have an area of three thousand square miles to explore, with no recognizable landmarks to go by.

The seleno-cell outside our ship is steadily flashing out its sparks, about every ten seconds. This should be visible within a radius of ten miles. Captain Atwell, staring at the mountain peak looming near, says that a seleno-cell placed up there would be visible for fifty miles at least. But that is a useless thought. Ironically, even if we did wish to try getting it up there, no

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one can approach the cell now without being electrocuted. It will keep operating while there is sunlight. The two other seleno-cells we had lie useless on Mars.

WE talk of nothing but Earth here. How it will look to us after our long absence. How green and lovely its fields, how sweet its air, how wonderful its foods—and its security. Earth is paradise! Greaves swears that after arrival he will fall down to the ground, bury himself in glorious mud, and stay there for three days. All of us have fantastic notions of what we want to do when we get back. Parletti is going to eat a roast steer, complete. Personally, I'm just going to fill my lungs with good, clean air, again and again and again—

Message from Captain Atwell to Captain Macklyn.

Macklyn, only desperation brings me to ask this. In six hours, if we are not found, we will be plunged into two long weeks of Lunar night. Our chances of living through that period are mighty slim. I have brought these six men to Mars and back, surviving many perils. I would hate to have them doomed now. Thus, I suggest, though it entails great risk for your ship, that you lower your vessel to within a mile of the moon's surface. If you then describe a large circle and keep shifting its center, you will soon have passed over most of this territory. You cannot fail to see us at a mile's height. But it will take constant rocket power and diligent maneuvering to do this.

I make no appeal for myself, Macklyn. I appeal only for these six brave men at my side.

EIGHT-HUNDRED and fifty-first day. (6 P. M.)

Black, chilling night surrounds us!

Captain Atwell wishes to thank you men of the rescue ship for your gallant effort, flying your ship at only a *half* mile above the moon's dangerous surface. It was our fate not to be found.

All of us watched closely for your ship, in every direction. Once Dordeaux thought he saw a black speck and a tiny red rocket flare, but when the rest of us looked, nothing was there.

However, there is one remaining hope, now that we are surrounded by the utter blackness of night. We have a few ounces of fuel left in our tank. We will discharge it from our uppermost rocket-tube. It should make a bright beacon if burned slowly with oxygen, perhaps enough to land by.

Markers suggests that you rise to a height of ten miles wherever you are and watch below in all directions. Signal me when you are in position and we will then light the flare.

* * * * *

Eight hundred and fifty-first day. (7 P. M.)

Captain Atwell to Captain Macklyn.

No! You must not try landing, though you saw our flare and were able to approach part way before it went out. I forbid the landing attempt, Macklyn, as you wouldn't have one chance in a million of landing without a bad crack-up in the dark.

We had expected the flare to burn a while longer. Fifteen more minutes and it would have given you time to approach and land. But too late now. However, my men and I join in saying, for the offer alone—God bless you!

You must now go back to Earth and come back in two weeks. Or, if you have plenty of supplies, you can rise to a height of a thousand miles, or so and simply drift there, unpowered, and wait. You must be prepared, if you locate our ship when daylight comes again, for the possibility of finding dead men instead of living.

Gillway speaking. Our morale is still high. We have faced worse hazards. Captain Atwell had put us on emergency rations from the moment of landing. Our oxygen consumption is down to one-third normal. Beyond a general feeling of lassitude, there are no ill effects.

Parletti carefully examined our air-supply and says that by a stretch of imagination five of us, or at the most six, could live on it for two weeks. How seven of us can survive, the Lord only knows.

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Must conserve battery-current for heating unit. Martian Expedition Number One signing off until the Lunar dawn.

EIGHT HUNDRED and sixty-fourth day. 3 A. M.)

Hello to those aboard the rescue ships!

Martian Expedition Number One resuming contact after two weeks. Dawn silently stole over this desolate world an hour ago, recharging my depleted batteries. It was a glorious sight to see the sunlight again—but painful also. When last we saw the sun, there were seven of us. Now there are only five!

Outside our airlocks lie the bodies of Swinerton and Dordeaux. They voluntarily sacrificed their lives, so that the rest of us might survive. God rest their souls!

We five that are left now have about four or five hours of oxygen left. We hope you can find us in that time.

Now to go back two weeks: After the black of Lunar night had closed in on us, despair came with it. We were hopeful when our last bit of fuel was used as a flare, but when that failed, we knew our situation was really desperate.

Our air supply, no matter how many times Parletti and Markers figured it out, could not last seven men for two weeks, even at the one-fourth normal consumption rate which we had already cut it to. Finally, at the end of that first day, Swinerton tried to get out at the air-lock but Greaves stopped him just in time.

Swinerton simply explained, "One of us has to go now, or seven of us will go in the next two weeks!"

We all looked at one another haggardly. There was no escaping that deadly logic. Captain Atwell then said, "Men, my leadership is no longer needed—"

The rest of us shouted him down on that before he got any further. Each of us volunteered to sacrifice himself. Melodramatic? The world will never understand. The decisive voice of Captain Atwell finally quieted us: "We will draw lots!"

That, of course, was the only way. Using the time-honored short and long sticks, Captain Atwell offered lots to each of us. He drew last, with Parletti holding the sticks. Seven times the process was repeated, to eliminate us one by one.

Finally it narrowed down to Swinerton and Dordeaux. I will never forget that final scene. None of us will. Swinerton tight-lipped but calm. Dordeaux pale, favoring his broken arm. The rest of us far more nervous than they. It is engraved in our memories forever.

Each drew three times—with death standing over their shoulders, watching. Swinerton drew two shorts and one long. He looked up with a brief, grim smile. The odds were strongly against him.

Dordeaux drew three shorts in a row, however. Swinerton looked dazed at this sudden reprieve. Dordeaux wasted no time. After a simple farewell and handshake with each of us, but with a depth in each movement that those on Earth will never know, he stepped out of the air-lock.

We saw him stagger away from the ship, out into the airless void. He turned into the deepest shadow of the ship, away from the ports, so that we would not see him die. Not many words were spoken in our cabin in the next hour.

In answer to your query, our map does not show the mountains you mention to the northeast, nor can we see any. But it is likely that Swinerton left them out in his hasty sketching, as he did not have much time while the ship was maneuvering down.

Will resume in an hour, when my batteries build up more of a charge from the sunlight.

FOUR A. M.

After Dordeaux was gone, we settled down to a routine to pass the interminable hours. We clung to the floor as much as possible to breathe less oxygen, but we seldom slept. Captain Atwell forced us to keep a card game going with rotating partners. The vague interest in this and the noises it made helped us to forget the

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awful stillness about us.

At times, though, there would be moments of utter, stifling silence which would hold us in a sort of hypnotic trance until someone coughed. Then we would all cough and scrape our feet and make noises, not wanting it to happen again.

We could not use the radio, naturally, since our batteries were not any too well charged. I reported that the current would never last. So Atwell ordered that the one dim bulb we had burning to be on only half the time. He also cut the heating unit's output to its barest minimum. Thereafter, we existed in a temperature not much above freezing, with all available clothing on our bodies. Radiation of heat from our ship, over the days, mounted up, though it was a slow process.

Our food rations also had to be cut, for that too had reached slim proportions. One-quarter protein-stick a day and one biscuit for each of us, washed down with a gill of water.

The thought of seeing Earth once more kept us alive. We also speculated what a sensation our pictures and records of former Martian civilization will create. These will eventually be found and brought back to Earth, even if we are not. That thought alone comforts us.

We are keeping sharp watch at our ports in every direction. If we sight your ship, I will radio immediately.

Air gauge pretty low now.

FIVE A. M.

It is simple to tell of Swinerton and why he lies outside—dead.

Soon after Dordeaux had gone, Swinerton addressed us all and insisted that he should follow him. Five, he argued, would have an excellent chance of surviving, whereas six was still doubtful, as Parletti admitted. By drawing of lots, Swinerton insisted, he was next to go anyway. Swinerton did not say these things in any exaggerated fashion. There was no fanaticism in him. He was one of those rare individuals who think things out calmly and dispassionately and then do them, or try.

Captain Atwell, however, sternly forbade any further discussion of the subject. Thereafter, he slept and rested almost continuously rolled in blankets before the air-lock. Swinerton had a gleam of determination in his eyes.

The second night—Parletti, whose bunk is just over Swinerton's, heard a strange, stifled gasping. We found Swinerton with a strip of cloth twisted tightly around his neck. His purpose, though he would not say a word, had been to strangle himself quietly so that we would have a longer and better chance.

We all kept an eye on him after that. It was no good to talk to him, tell him he was wrong. Perhaps he was insane. But it is not for us to judge.

He seemed to get over it in the next three days. We relaxed our vigil. He joined in our card game and conversation as though nothing untoward had happened. But he would sit for hours when the cabin was dark, staring out of a port at the looming, jagged mountain nearby as though still thinking he would like to meet its challenge and climb it.

We all spent much time at the ports for that matter. Somehow, the moon is a fairyland in the starlight, its harshness softened. Surprisingly, in this airlessness, the starlight has considerable strength. Every detail of the night scene stands out.

The third night Swinerton was gone! Atwell had fallen into an exhausted sleep at the air-lock. Before he could jump up when he heard the levers squeak, Swinerton had got into the lock chamber. Atwell stood by helplessly, hearing the outer lock swing out and then clamp shut again. We found the captain there, shoulders sagging, eyes dull.

"There went the bravest man the world has ever known!" he said hoarsely. And that, if we who are left are not alive to carry it out, is to be the epitaph engraved on Swinerton's tomb. Remember!

* * * *

Six A. M.

There is not much more to tell of those two bitter weeks. Aching lungs, starved bodies, blue-cold fingers—and the silence. That damnable silence!

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Well, we have survived it and when we saw the first bit of the sun's rim climb over the horizon, it was the end of an eternity.

The coming of the sun has raised our spirits as well as our thermometer. We are keeping sharp watch for your ship. We are not losing hope. We have cut our oxygen stream a little lower again. You have been searching for three hours so far, since the dawn. There are one or two hours to go.

Atwell has just announced something strange. The huge shadow of our guardian-mountain has retreated enough to reveal the space before our ship. The seleno-cell is gone!

Furthermore, Swinerton's body cannot be seen anywhere around the ship! The corpse of brave Dordeaux is plainly visible.

And now a third thing. An air-helmet and small oxygen bottle which goes with it are gone!

What does this all add up to? We can guess but it seems incredible. Captain Atwell has just gone out in our spare air-helmet to bury Dordeaux. We will then hold a brief mass for him. He deserves that if it's the last thing we have the strength to do.

SIX forty-two A. M.

Attention, rescue ship!

Markers has just noticed a moving light among the stars to the west. If it isn't a comet, it may be your ship. There is a breathless silence in our cabin, and a prayer on every lip. Our oxygen gauge's needle is almost touching the zero mark.

Yes—it must be your ship!

Or rather, the orange-red flare of your rockets. Slow down and turn east immediately—but I see I am giving you needless directions.

You are now approaching, as we can see the rocket blast getting brighter.

You are now crossing the mountain range. The plateau beyond is the one we are on. We can make out the outline of your ship now. Captain Atwell says not to lower for a landing from that direction, as the space is shorter that way. Swing south and come up to us from that direction.

You can see our ship now? Thank God—we are saved!

It is plain now. Those giant blue sparks that are playing around the peak of the mountain nearest us, and which you saw from fifty miles away, are from our missing seleno-cell!

Swinerton's body must lie beside it, lifeless since ten days ago, when he left us. None of us suspected at the time that he had taken the air-helmet. He had oxygen enough for about twelve hours. He had said he could climb that mountain in twelve hours. And he did it, in the starlight and carrying the seleno-cell!

We have already written Swinerton's epitaph. We cannot add to it. Someday we will have those words engraved on the side of that mountain, in letters of gold.

But now, what shall we say of Dordeaux? Burying him, Captain Atwell noticed his one hand half open, holding something he had been clutching before death overtook him. It was simply a bit of wood—one of the short sticks we had used in drawing lots. We had noticed Dordeaux fumbling the sticks he drew each time with his two hands, but we had attributed this to his broken arm. Now it is obvious that the sticks he showed and the sticks he drew were not the same!

He had an eighth substitute short stick all the time, with which he made certain his own sacrifice!

WE can see your ship lower now, a long sleek craft. Careful! Keep the nose up! There! As you touched and plowed along, a sparkling shower of pumice-spray surrounded you, like snow.

And as your ship stops, not a half mile away, my companions are cheering and screaming and pounding one another on the back—I'll join them in a moment. Soon you will be coming to us, in air-helmets, to take us into your ship. Soon we will be on Earth! We can hardly believe it yet.

By the grace of God, five of us live to see this great moment. But only at the price of others whose names will go down forever in the history of man.

Martian Expedition Number One signing off.

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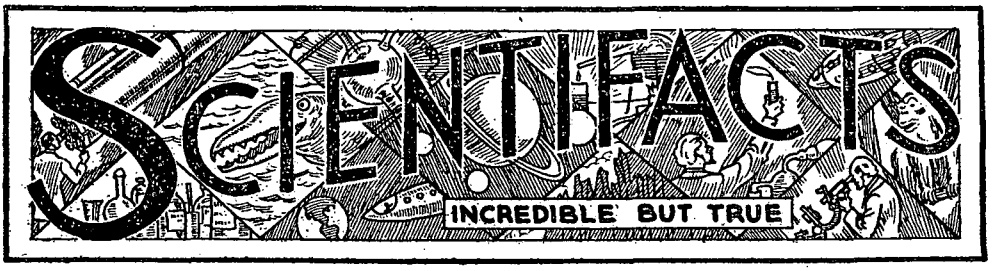

THE PERPETUAL BOMBARDMENT

EVERY day 20,000,000 to 40,000,000 meteors strike the earth's atmosphere! In virtually all cases, the meteors generally burn to dust. H. H. Ninger, secretary of the International

Society for Research on Meteorites, has estimated that the meteor deposits are sufficient to cover the earth 19 feet deep in 60,000,000 years.

A meteor weighing only a few pounds may leave behind it a dust-cloud covering an area of many miles, and from 20 to 60 miles high. It is through this constant bombardment of shattered fragments of cosmic bodies that the earth is continually being built up.

HOT AND COLD

THE sun shines hottest on high mountain tops where explorers shiver with the intense cold!

Observations of solar radiation from the summit of Mount Aunconquilcha, Chile—nearly four miles above sea level—where its intensity is nearly one-sixth again as great, have been reported to the Smithsonian Institute.

The radiation-measuring device used was set up on a cake of ice. Although of course, the result was to be expected, it seems a little incongruous to be suffering from the cold and at the same time measuring solar intensity far greater than that which would have been recorded in the hot desert far below.

THE DEATH STARS

A LAYER of ozone high in our atmosphere saves mankind from extinction by death rays!

Discovery and isolation of a new group of stars, the rays of which would wipe out all earthly life if they could reach it, was recently announced by Dr. Charles G. Abbot, as the result of research at Mount Wilson Observatory.

A vast shower of "death rays" sent out by these stars was found to consist mostly of ultra-violet rays of very short wave length. Similar radiation is given off by the sun, but fortunately the death rays cannot reach the earth because they are screened out by the protective belt of ozone nature has created in our stratosphere.

Virtually all the blue-colored stars in the heavens were found to be of the "death" type. A typical one of the blue "stars of death" is Rigel, a star in the left foot of the constellation of Orion, which is literally "too hot to be bright."

THE ETERNAL TREE

THE macrozamia trees, found in the Tambourine mountains in Australia, are probably the oldest inhabitants of the earth. They are estimated to be more than 12,000 years old. Dr. A. O. Herbert of the University of Queenslands sets for one of them, Great-Grandfather Peter, an age of approximately 15,000 years. It was cut down by vandals a short time ago, but maintained life for three months thereafter.

According to late reports it has started a new life on replanting. So slow-living is this giant that ten or twelve years should elapse before its complete death even if it were not to grow again.

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QUIET, PLEASE!

BETWEEN four walls of a scientific laboratory are enough distortion and magnifying of noise to drive a person insane in half a day!

Noise—and noise insulation—are important, so a unique chamber has been built to study them. In a specially constructed room at the Johns-Manville Research Laboratories, all the worst

features making for noise have been combined into an architect's nightmare. The walls are hard, reflecting surfaces, set at angles to one another. The floor throws back any sound. The roof is set at a tilt. In the center of the room is a loud speaker mounted on a pendulum which swings back and forth distributing the noise evenly in all parts of the room.

In the ordinary room a sound dies away almost immediately. Here each sound lasts for twelve seconds, hundreds of sound waves may be sent whizzing from wall to wall in those twelve seconds.

It is possible for a man with a wide voice range to sing all four parts of a song at once—a one-man quartet. What a place for a yodeler!

THE VANISHING ISLANDS

THERE won't be so many Pacific Islands for nations to argue about 5,000 years in the future, if sea levels continue to rise as they have in the past, according to geologists, who point out that all but the most rapidly growing of the coral atolls of the South Pacific, now prized as air bases, will be submerged or greatly reduced in size in the near future.

Sea levels are now rising at the rate of one foot every twelve years, due to the melting of the Arctic and Antarctic ice caps, left over from the most recent Ice Age, which began to decline only about 50,000 years ago. When this ice has all melted away, sea levels will be at least 100 feet higher than they are at the present time.

THE WORLD'S KEENEST DETECTIVE

IF somebody shows you a slit piece of metal, a lens and a prism, and says, "With these I can analyze the sun, weigh the stars, measure the speed of comets and find a needle in a haystack," don't make the mistake of doubting him. For these are the essential parts of the spectroscope, the world's keenest detective.

Recently a scientist at the Massachusetts Institute of Technology amused himself by trying to calculate how much water would be required to

dilute a teaspoonful of salt so completely it couldn't be discovered by chemical means. Theoretically, he dissolved it in a tub containing fifty gallons of water. Then, to make extra sure, he hypothetically mixed the solution with 2000 times as much additional water. Not even the most careful chemical analysis could find a teaspoonful of salt in 100,000 gallons of fresh water.

The scientist felt pretty satisfied—but not for long. A colleague showed him how a single drop of the dilute solution, sprayed into a gas flame and examined with a spectroscope, would reveal the hidden sodium chloride. With a spectroscope, an expert would not only be able to find the salt—he could also estimate within a pinch the total amount originally dissolved in the tank!

(Concluded on page 126)

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To the Maddening Tones of an Obbligato of Doom, Atomic Intelligences from an Outside Realm Search for a Gateway to This World!

Blythe turned on his sonic generator

SONG OF THE SHADOW DEATH

By ROBERT MOORE WILLIAMS

Author of "The Man Who Looked Like Steinmetz," "Beyond that Curtain," etc.

I MET Eric Blythe as I was leaving a physics lecture I had been assigned to cover. He was about twenty-five years old, an obstinate, frightened kid, who gave the impression that he was listening for something nobody else in the room could hear, and was desperately afraid he would hear it.

He was talking to a tall, gaunt person whom I recognized as one of the big shots in the scientific field, and as I approached I overheard the last protesting words of their conversation.

"But Dr. Folsome, Marwell is wrong. Dirac's equations require us to accept the concept of negative energy levels, an infinite number of such levels. In fact, we know that Marwell is wrong and Dirac is right."

The kid's face was white and strained and Folsome wasn't doing any smiling, either. I eavesdropped shamelessly. Marwell, who had delivered the lecture

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of the evening, had spent forty-five minutes punching holes in Dirac's theory, and here some kid was insisting that Marwell was wrong and that Dirac was right. And saying that he and Folsome knew that Marwell was wrong!

Dirac is a famous scientist, as you probably know, and he says that the fundamental foundation stones of the Universe are negative energy—something that you can't feel or see—a synonym for empty space. He also says that the human race and all the phenomena of nature upon which the race is dependent, are built on the shaky foundation of—nothingness!

The kid's words added up to news, if I could ever get them past the city editor. Of course, I barged in like a fool and started to ask questions. Folsome was polite. He used a lot of words that didn't say anything, giving me the old runaround but being nice about it. I turned to the kid. He got sullen and defiant and told me to go peddle my peanuts.

There wasn't anything more for me to do around that lecture hall, so I beat it. The last glimpse I had of Eric Blythe, he was still giving the impression he was listening for a sound nobody else in the room could hear . . . .

I TURNED in half a column on the lecture and the city editor cut it down to four inches. Nobody had been killed or injured and Dirac is too deep to rate the news.

Two weeks passed and I forgot about the lecture. News was coming into the office, stuff that the editors and the whole staff knew was news. No, you're wrong. It wasn't a murder case. It was was worse than that.

One of our wild-eyed country correspondents living down in the hilly southern section of the state, in Orangeville, turned in a fantastic story about some farmer who had suddenly gone mad. He had come crawling into some little town and the flesh had been worn from his hands and knees. His eyes had been the eyes of a dead fish, and he had uttered strange, whimpering animal cries. His face had the blank features of an idiot.

The townspeople identified him as a farmer living under the slope of Old Baldy. He had been a strong, resourceful, rugged man until this had happened to him.

And then, shortly afterward, another man with dead eyes had been found wandering in the fields. He looked like a tramp but he had never been identified. Neither of the men could tell what had happened. They only stared at their questioners. The doctors were baffled.

A salesman, driving along the highway, had seen a woman digging in the ground for grubs. He had stopped his car and attempted to investigate but she had fled. Later the state police had brought her in. She was in the same mental condition as the two men.

Keen-minded scientific physicians, called from the city to Orangeville, had examined the woman and the two men, and had mumbled.

Strange assignments are my weakness, so I wasn't surprised when my editor ordered me to follow up the story. I found the town soon enough. There were about five hundred badly scared people in it. After hunting up the doctors and asking them questions, one of them suggested the possibility that a new disease had broken out in Orangeville. He was well enough up on his science to hint that light-driven germ spores might have floated to Earth from another planet. He mentioned the Black Death. Springing from nowhere it had swept across Europe in the Middle Ages. A new and extremely virulent form of influenza had rocketed over the earth in 1918, taking a tremendous toll. Maybe it had happened again. Yeah, maybe.

I saw the two men and the woman, too, but that is one thing that I prefer not to describe. The sight of a man who has become a beast, who crouches in the corner of a room, growling and yapping, is too unpleasant to record here.

There were lots of things to think about in that jittery little town, but nowhere was there a lead. Our local correspondent helped all he could, but he didn't have any ideas. No one had any ideas about the cause of that malady.

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There was only fear.

Then I ran into Eric Blythe.

He was at the express office, swearing weakly as he tore the cover from a packing case consigned to him.

The best word for it is hunch. You don't know how you know but you know. When I saw Eric Blythe I knew I had found the lead that would crack that story.

"Hello, young fellow," I greeted him. "What are you doing down here?"

He prodded his memory as he stared at me.

"You're the reporter, aren't you? What am I doing? Probably the same thing you are." He shut up then, but he realized he had said too much.

"Found any of the answers?"

He shrugged.

"Listen, pal, whether you like it or not, you're going to see a lot of me," I persisted. "You might as well make up your mind about that. I'm sticking with you until I find out what you know."

He blinked at me.

"You are? Well, I'm going up there."

He pointed at Old Baldy, a granite outcropping snoring in the spring sun above us.

"Okay. Why?"

HE answered before he thought.

"Professor Folsome is—"

"Oh, the professor is in this somewhere, is he? Now just exactly what in the hell have you two been up to?"

"Nothing!" he blazed. "Professor Folsome is entirely innocent. He did not anticipate such a result. How could he know that the electrons we lifted out of the negative energy levels would combine into some unknown type of atom and develop intelligence?" How could he know that these atoms would invade our world, entering the shells of men, destroying their minds in the process?"

I gulped. Then I hounded him with questions. He shut up, but I stuck right with him while he took the material out of the box and made it into a bulky pack, which he strapped on his shoulders.

"I'm going up Old Baldy," he said, turning to me. "Since you are so damned persistent, you may come along. But remember—you may never come back—"

"As bad as that?" I asked, batting my eyes.

"Worse than that!"

Well, I wasn't getting paid to make a martyr out of myself, but news is news.

As we started to leave, there was a sudden shout in the town. People started running away from a common center. Blythe moved automatically in that direction and we saw what the people were running away from. A man crawled along the center of the street, a man who had suddenly become an imbecile. I recognized him. He was our local correspondent. Half an hour earlier he had been in perfect health.

"Hurry!" Blythe snapped. "We've got to get up there—fast!"

His voice was a cracked, pitiful thing, filled with horror and terror and fear. He looked like a weakling.

We went out of the town, half running, half walking.

Around us I saw other men walking and running and getting into cars. One man pushed his wife and two kids into a car. The town was leaving. It had seen too much that it did not understand.

And there was a ghost of a song in the air, a thin high note that was almost above hearing, a malignant evil whispering coming down the bright spring wind. We were out of the town and in the woods leading up to the base of the bald hill when I realized I was hearing that shrill whine.

I noticed that Blythe was keeping his ears cocked up and was listening, too. With a shock, I remembered that he had been listening since I first ran into him. And even before that, when I met him at that lecture, he had been listening. . . .

The new leaves of a scrub oak stirred as something that was no wind passed through them. A dappled, latticed shadow flashed along the ground. It seemed to belong to something that was almost visible.

Blythe was breathing hard and his hand was clamped on a tiny switch fitted to the end of an extension cord

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coming out of the pack on his back. His face was lined and strange and old. He reached around and turned the knob on an instrument projecting from his pack and there was a new note in the air. High and thin, it went out of hearing and came back as he twisted the knob.

I remember the thought flashing through my mind that perhaps Eric Blythe had deliberately caused this strange malady and I slipped my hand into the pocket where a cool little pistol nestled. I watched him. He was scanning the rocky woods, his keen eyes probing into every shadow, roving, searching. The skin was stretched tight over his cheekbones and his mouth was a narrow slit. I knew then that if he were responsible, the thing he had created was out of his control. For he was scared, even more than I.

He knew, or ought to have known, what he was facing. I didn't know. But at that moment if I had known the horror that was in those spring woods, I would have run as long as I had strength in my body to move my legs, and when that strength left me, I would have crawled.

THE dappled silver shadow came back along the ground, moving fast, moving faster than the eye could follow. Like the shadow of a ghost, it was something you could not see; it was the flashing impression that something had been there and had gone and that the coming and the going had been too fast for the eye to follow.

It was round and perhaps a foot in diameter, and the high, wailing note was there with it, and then the note was gone, too. It died away in the direction of the solid granite outcropping known as Old Baldy.

I felt my flesh crawl and I know my voice was harsh and lashing as I spoke to Blythe.

"What are you getting me into?" I demanded.

He saw it from my angle then, for the first time.

"You wanted to come along." His voice changed. "I shouldn't have permitted it. It is my fault—I'm sorry, skipper, but you were so damned persistent. . . . You should go back. . . . But no—I don't think you can make it."

As he spoke the woods rang with a sharp cry, a sound torn from a human throat in agony. Somewhere ahead of us a man screamed in terror and pain. He was running toward us.

Blythe grabbed at his pack and the note coming from it shifted and changed. The man wobbled as he came nearer, not exactly like an exhausted runner, but like a man who has lost the will to run.

Blythe dashed toward him and I followed. I wanted to go in the other direction, but Blythe was approaching the man and I had no choice.

We came near. The man stared stupidly at us. He sat down heavily, picked up a bright pebble, stared hard at it, and burst out laughing. I caught my breath. There was a vacant look in his eyes and saliva was drooling from the corners of his lips. He picked up another pebble, compared the two, and the mad laughter burst forth again.

The ghost of a song was in the air, a thin high note that was almost above hearing.

Blythe dropped on his knees beside the man, but did not touch him. His fingers played with the knob projectin from the pack at his back, and the note from the pack shifted and changed. There was a mad scramble of mating tones and weird undertones and overtones and halftones. There was a rapid beat frequency and then a slow beat tone. The beat slowed and slowed and there was silence.

The eyes of the man were suddenly sane, but the sanity in them was full of pain and terror.

The beat pulsed again. The sanity went from the man. He picked up another pebble, stared at it, and his mad laughter echoed through the woods.

I stood there, staring, wondering, gasping. What was happening here? I got the impression of conflict, of a terrific battle going on, a battle in which the weapons were sounds, high, thin tones. One tone was coming from the man and the other tone was coming from Eric Blythe's pack and when they were in perfect step there wasn't any sound.

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Blythe was fighting desperately. What? God. . . . there wasn't anything to fight, except a crazy man squatting on the ground, but Blythe's lips were drawn back from his teeth and he was snarling like a beast at bay. His lower jaw jutted out, savage growls rumbled in his throat, and his chin was flecked with a fine foam.

MADDENINGLY the tones scrambled and clashed again and the beat came back and slowly vanished into silence. The man stared at the pebble in his hand and pitched forward on his nose.

I think I screamed.

There was something on the ground in front of Eric, a gray shadow that I could see and yet couldn't see. As the man collapsed and pitched forward on his nose, the shadow somehow seemed to puff out of him.

Don't ask me how. I'm telling what I saw.

I could look through the shadow that had "escaped" from the man's body. The pebbles on the ground shifted and twisted as the light waves bent. It looked a little like thin gray smoke, so tenuous that you could not be certain you saw it. It bounced and writhed and gyrated.

The spiteful crack of my pistol shuddered through the spring woods as I fired involuntarily. The bullets zinged from the ground. They passed through the twisting, latticed shadow and did not touch it. The thing was not matter in any form with which we are familiar.

It was vaguely round and perhaps a foot in diameter. It tried to lift from the ground, flopping like a chicken with its head off.

The matching tones screamed in pain. For an instant the shadow clouded like pearly gray mist on which the sun is shining. There was a soundless puff, and I felt my skin tingle from a flood of invisible rays. The shadow was gone.

Blythe sobbed aloud. There were tears on the face of this damned weak kid. His fingers relaxed on the switch and the note from his sonic generator cut off. A wind stirred the new leaves of the scrub oak trees with an infinity of scratchy rustlings and the silence of the spring woods was broken by the labored sound of Eric Blythe fighting for his breath.

To hide my contempt, I turned away from him, bent over the man on the ground. He regained consciousness. Whimpering, he scrambled to his knees, gave us one fearful look, and, stumbling, slipping, and falling, he waddled away. I called sharply to him to stop but Blythe motioned me to let him go.

"He's done for. We got to him too late."

I tried to be calm, to think logically, but I, too, was afraid, terribly afraid, only I wouldn't show it. I wanted to run, but did not dare, for I knew that Blythe had some method of protection and away from him one of those shadows would drop down on me and, well —when I was found wandering in the fields, my press card would identify me.

But I had to know and my voice was a savage snarl.

"What was that thing?"

He tried to tell me. He sat there on the ground, rubbing the tears out of his eyes, and told me about Bohr and Schrodinger and Dirac, and the equations developed by these men. Puffing and panting, he gave me a lecture in physics, the damned fool!

"Blythe, will you cut the lecture and tell me what that damned gray shadow was?"

I can ask questions in a nasty way. I've had to learn.

He winced at my tone.

"You won't understand, but I'll tell you. That shadow was a form of negative energy. . . ."

That convinced me. Negative energy! The fool! Eric Blythe was hopelessly cracked. I swung my gun up until it pointed at him.

"Come on, you fool. We're getting out of here."

HE sat there, staring at my gun.

"No. . . . No. . . . We can't leave. Professor Folsome has a private laboratory up here and we've got to get through to him. We were working up here when we lifted those electrons out of the negative energy levels. Folsome

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sent out for the equipment to destroy these shadows. He is still in his lab, unless his generator has failed. We've got to get through to him, or not one can foretell the consequences!"

He said it so simply that I knew he was sane and that, impossible as it sounded, he was telling the truth. But I wanted to get out of there.

"To hell with the consequences. I'm looking out for my own neck. I'm giving you ten seconds to make up your mind, and if you don't come along, I swear I'll shoot you and take the pack you're wearing."

"To hell with you!" he snapped, with a show of spirit I did not think was in him. "Go on and shoot. Without me to operate this generator, you won't get a hundred yards before you hear the song of the shadow. Oh, you'll get back all right, but you'll be an idiot. . . ."

That sobered me. Remember, I had seen those slavering idiots.

"I don't blame you for being scared," he spoke, rising. "I'm scared, too. But we've got to get through to that lab before those shadows become strong enough to break down Professor Folsome's defensive generator. I'll tell you what I know as we go along."

We went. He told me about their experiments. They had used gamma rays to excite electrons in the negative energy levels. To their horror they had seen those electrons manifest signs of intelligence—had seen them deliberately combine to form abnormal atoms, atoms that had built up into molecules.

Oh, they hadn't seen the electrons and the atoms and the molecules with their eyes, but their cloud chamber had told them what was happening and they had seen the growing mass of smoke in the chamber and had heard the thin high note come into existence. The note was an obscure but fundamental by-product of the life process of the shadows. That it was within the range of hearing did not puzzle him. It merely happened that way. All animate and inanimate things vibrated at some frequency. The process of thinking as carried on in the human brain unquestionably resulted in some vibration frequency as a by-product.

Blythe said he thought the shadows deliberately matched the vibration frequency of the human brain. That was his explanation of those idiots. The brain went to pieces when its fundamental vibration frequency was matched just as that shadow had disintegrated when Blythe had tuned his sonic generator to match the song of the shadow.

He went off into mathematics then and I didn't get his explanation. I watched. I saw the leaves move when there was no wind . . . I glimpsed dim dappled shadows floating along . . . I had to force myself to walk up that hill toward the bald granite outcropping above.

The song of the shadow came down at us and Blythe stabbed desperately at his pack and the shadow passed us by.

"They are watching and following us," he said. "They don't want us to get through to the lab."

"Are there many of those things?"

"I don't know. They reproduce by fission, but I don't know the speed of the process. But I think they will all come in an attempt to destroy us. They have to. If they don't, we'll destroy them, and they know it. It's the eternal struggle for survival."

I WAS watching as he talked. I saw the green of a clump of cedars stir as something that I could not see came through them. I yelled at Blythe as the song came, and he grabbed the knob on his pack.

A thin gray mist danced and gyrated in front of us. There was the same clashing of tones and I held my breath as the beat frequency slowed and slowed . . . A pressure started to build up in my mind, but the beat frequency slowed to nothing and the shadow sullenly withdrew, and as it withdrew the pressure went from my mind. I had the feeling that the shadow followed us, matching our labored progress, watching and waiting. The song came and went in my ears. Now I could hear the thin high tone, now I couldn't.

And I knew, as we reached the last steep slope that led upward to a weatherbeaten building that Blythe said was Folsome's laboratory, that others had joined it.

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The malignant evil whispering song came and went continually. It built up to a high drone, like a swarm of bees on a warm spring day.

Was I afraid? No, I think not. There is a point in fear, as there is in fatigue, where you reach your second wind. The damp cold sweat dries from your body and you quit jerking your head to look over your shoulder. You reach this point when you know, finally and completely, that you cannot turn back, that no matter what is ahead of you, it has to be faced.

The high drone came down to us from all directions. A shifting, twisting wave rolled from rocks and trees, frothed toward us.

Blythe turned on his sonic generator. The shadows continued to advance. Slowly they drew nearer.

Their vibration frequency started to dig into my brain.

"Tune your damned generator!" I whimpered to Blythe.

He tried and failed.

"We've got to make a dash for it," he whispered. "Before their numbers overwhelm this generator."

A steep slope led up to the lab. We ran part of the way, part of the way we went on hands and knees, the last few steps we crawled. The shadows ringed around us. They seemed to pull us away from that lab.

There was a maelstrom in my brain, a whirling tornado that constantly increased in pressure.

The door of the lab opened and a tall gaunt man looked out. I heard the failing note of another generator coming from within the lab, and then the man was outside, dragging us in. He slammed the door. His eyes went to the window and I followed his gaze and I screamed.

The clear panes were slowly becoming opaque as the shadows pressed against them. Slowly, ever so slowly, but with the certainty of doom, they filtered through the glass and around the sashes. Bulging, indistinct knobs pressed into the room.

The tornado in my brain was threatening to explode. Blythe and Folsome were shaking and trembling and I knew they were feeling it, too.

Blythe yanked his pack from his shoulder and he and Folsome dug into it. Swiftly they examined the generator, working as well as they could. The note from the pack built up, became more powerful, and the shadows oozed back.

Simultaneously the pressure eased within my skull. I dared to breathe.

Blythe collapsed in a chair.

"I got here as quickly as I could," he said simply.

FOLSOME was very gentle in his answer.

"You did a splendid job to get here at all, Eric. Did you bring the equipment?"

Blythe nodded.

They went to work, utterly ignoring me. When I tried to ask questions, Folsome told me to sit down and shut up. I did just that. Folsome had a way with him. He was as strong a character as Blythe was weak. Blythe had intelligence, but it seemed to me that something had been left out of his make-up, and instead of having courage he whined and whimpered.

They had a plan which they didn't bother to explain to me, but I gathered that Blythe was to play a responsible part in it, for he whined when the professor showed him the trap he had built in the other room.

Folsome took the equipment that Blythe had brought and attached it to eight sonic generators, one in each corner of the adjoining room. Yeah, it was a trap all right, but it was a trap that needed bait.

Blythe kicked and raised hell about part of the plan. Folsome tried to sooth him, but it didn't do any good. Long and lean-jawed, Folsome was strangely calm.

They seemed to have forgotten the gray wall of shadows surrounding us, pressing against every window of the building, waiting, watching, held off by the note from the generator, but waiting for that to fail, and building up strength all the time they waited.

They argued about something else, something that I didn't understand. I swore at them, called them damned fools, told them to get going, for there

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was a constant shriek of pain inside my skull. They paid no attention, although they must have felt the pain too.

"No," Folsome said to Blythe. "My way is best. Remember, I started this thing . . . It is my responsibility."

"You didn't start it any more than I did. And it's my job."

Blythe's voice pleaded and begged. The damned whiner!

"Cut out that confounded argument and do something!" I shouted. "Those shadows are becoming stronger each minute."

Blythe and Folsome stood in the door of the adjoining room, the room where they had built their trap. They looked at me, this oddly assorted pair, this strong man and this weakling.

And I got it.

They were arguing about who should be the bait for the trap. One of them was going to step into the adjoining room and cut off the generators in there and the shadows would swarm over that man . . . and then the other man would turn on the generators in the corners of the room and the shadows would be trapped.

One man couldn't do the job, because a fractional second after the generators in that other room were cut off, the man who was in there would not have enough mind left to do anything.

It was such an unpleasant way to commit suicide. . . .

Professor Folsome was insisting that it was his duty and Eric Blythe was. . . .

They stood in the door of the room, this oddly assorted pair, and the shadow death hovered at every window and every door, filtered through the glass of the windows and under the sashes and through the wooden walls.

ERIC BLYTHE smiled a twisted smile.

"You win, Professor Folsome," his voice quavered. "Good luck."

He held out his hand. Folsome took it.

It was a shock to me. I had not thought that Eric Blythe had enough guts to argue such a point.

Shock, hell!

Folsome took the hand Eric offered him. The old scientist was calm and detached. He had seen a lot of living and dying would be only another experiment, an experiment that unfortunately would be unpleasant. So many of them were. . . .

They stood in the door. Blythe did not release his grip on Folsome's hand. He yanked Folsome from the adjoining room, twisted his body, shoved the professor violently toward me. I caught him as he tripped and fell.

Eric Blythe smiled at us. Then he turned quickly to the other room. The sound of the generators in there was suddenly stilled. Only the weak generator in our room sounded its failing note.

There was a mad flutter of high shrill tones. The windows of our room cleared as if by magic.

Bait for the trap . . . bait for the trap. . . .

Folsome tore from my grasp, rushed toward the door. On the threshold he recoiled. I stared over his shoulder.

Eric Blythe sat on the floor. His body was covered with a swirling shadow mist. There was nothing that we could do. The trap had been baited. All that was left was to spring the trigger.

I watched him die as the shadows attacked him. And when the room was full of them and no more came through the walls, Folsome snapped the switch that cut on the generators in there, the switch Blythe had opened.

There was a wild scramble of rising tones that climbed up to a scream. The gray mist swirled over Eric Blythe. The generators in the corners of the room howled at their overload.

Harsh, whining, mating tones. Beats throbbing, dying, throbbing. Swirling, fading, glimmering shadows, a flood of gamma rays released as the negative energy went back to its own level.

The notes ran up the scale and up and up and whined and cried in pain. The swirling mist faded, coalesced, leaped up, died down again. I felt the vibrant pulse of invisible rays.

There was a soundless flash, an unheard puff of energy, and there remained only the sound of the sonic generators.

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And a man sobbing . . . I whirled. Folsome was sobbing.

In the other room was nothing but the twitching body of Eric Blythe.

The shadows were gone, all gone.

And another man was sobbing. Yeah, I was that man. . . .

I wonder if Eric Blythe heard us.

The first time I saw him he gave me the impression that he was listening for a sound that no one else in the room could hear and was desperately afraid he would hear it. . . .

Fool that I am . . . fool that I am . . . I had come up that hill, through that tangled forest, with Eric Blythe, cursing him for a coward and a weakling, not realizing that I was walking with the bravest human being I had ever known.

ANSWERS TO SCIENCE QUIZ

(See pages 46-47)

POSITIVE OR NEGATIVE?

1. True. The bending of light-rays in a gravitational field is a different thing altogether.
2. False. This popular legend was recently debunked by Dr. Irving Langmuir, who demonstrated the deer bot fly's speed to be nearer 25 miles per hour.
3. True.
4. False. We do not even know if genes exist! They are looked upon as useful but entirely hypothetical discrete units.
5. True.
6. True.
7. False.
8. False.
9. True.
10. True. If you think not, try and imagine what a piano recital by Paderewski would sound like!
11. True.
12. False.
13. True.
14. True.
15. False. Electrons okay, but protons 93,000 miles a second.
16. False.
17. True.
18. False. Light **always** travels at the constant rate of 186,000 miles a second, no matter what the motion of the emitted source may be.
19. False. Even psychologists can "guess" the I.Q. of a person but very slightly.
20. False. The recession of nebulae is an **hypothesis,** not a fact, based on a particular interpretation of the spectral shifts toward the red.

TAKE A LETTER

1. a
2. b
3. b
4. d
5. c
6. a
7. c
8. d
9. a
10. b

THIS IS ELEMENT-ARY

1. zinc
2. silver
3. boron
4. cobalt
5. nickel
6. helium
7. sodium
8. copper
9. barium
10. silicon
11. mercury
12. magnesium
13. manganese
14. platinum
15. phosphorous

NUMBER SERIES

1. The velocity of a falling body in feet per second at the end of each second.
2. The only two undiscovered elements.
3. The maximum numbers of electrons in the successive rings of the atoms, starting from the inner ring.
4. Bode's Law—giving the approximate relative distance of the planets from the sun. A fallacious theory.
5. The I.Q.'s of the idiot, imbecile and moron respectively—and how did **you** come out?

SCOPE SCOOPS

1. An electroscope is an instrument for detecting the presence or sign of electricity on an object.
2. A thermoscope is an instrument for idicating minute differences of temperature without measuring them accurately.
3. A diaphanoscope is a viewing box for photographic positives.
4. A stereoscope is an optical instrument illustrating the phenomena of binocular vision.
5. An helioscope is a form of telescope fitted for viewing the sun without pain or injury to eyes.
6. An hygroscope is an instrument for indicating the amount of moisture in the atmosphere without measuring the amount.
7. A fluoroscope is a device for observing the effects of X-rays, consisting mainly of a fluorescent screen and a hood to protect the eyes.
8. A stethoscope is an instrument used for performing mediate auscultation. By means of this instrument the respiratory, cardiac, pleural, arterial, uterine, fetal, intestinal, and other sounds are brought to the ear of the observer.
9. The hydroscope is an instrument which makes it possible to examine, at practically any depth, the bed of the sea. (There are other instruments known by this term.)
10. A chronoscope is used in measuring the velocity of projectiles or other rapidly moving bodies.
11. A kaleidoscope is an optical instrument which, by an arrangement of reflecting surfaces, exhibits an infinite variety of beautiful colors and symmetrical forms of its contents.
12. A pyroscope is an instrument to measure the intensity of heat radiating from a body.
13. A spectroscope is an instrument used in spectrum analysis.

Another Great SCIENCE QUIZ in the Next Issue

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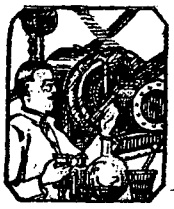

Science Questions and Answers

THIS department is conducted for the benefit of readers who have pertinent queries on modern scientific facts. As space is limited, we cannot undertake to answer more than three questions for each letter. The flood of correspondence received makes it impractical, also, to promise an immediate answer in every case. However, questions of general interest will receive careful attention.

PROOF OF THE EARTH'S ROTATION

Editor, Science Questions and Answers:

Scientists tell us that the Earth spins on its axis. Very well—but can scientists prove that fact?

E. L.,
Chicago, Ill.

One of the ways of proving the Earth's rotation is by the aid of Foucault's pendulum experiment. The principle upon which this is based is that a pendulum once set vibrating continue to move in exactly the same plane of motion.

Let us make this experiment at the South Pole. There we build a large dome-shaped building, and inside, a hundred yards from the ground at the highest point of the dome, we fix our pendulum. At the bottom of the weight there is a fine point. Under our pendulum there is a table, which bends up a little toward the edges and is covered with fine sand. Our apparatus is placed in such a way that the pendulum, when it starts to swing, traces a slight furrow in the sand.

It is dark outside, and we can see through the middle of the opening of the door a bright star shining just above the horizon. We set the pendulum swinging exactly toward the middle of the opening of the door, and precisely in the direction of the bright star. The first trace is made in the sand. Before the pendulum has swung more than a few times we see that a change has taken place; the fresh line does not exactly coincide with the first. After six hours have passed the pendulum is still swinging. During those six hours the plane of motion has turned further and further, until at the end of that time the latest trace in the sand is at right-angles to the first.

The pendulum no longer swings in the direction of the middle of the door, but toward a point in the dome, where, not far from the ground there is a window. Through the window we can see a bright star, the same one we were looking at before. The swing of the pendulum has remained unchanged in the direction of the star.—Ed.

THE IMPERFECT VACUUM

Editor, Science Questions and Answers:

In your last issue, in the interesting department, SCIENTIFACTS, I read that man has not yet been able to create a perfect vacuum. What I would like to know, is this: is man trying to create a perfect vacuum?

B. O. N.,
Newark, N. J.

For more than a quarter of a century William A. Ruggles has been at work in Schenectady, at the task of obtaining high vacuum for the General Electric Company. He is in charge of the manufacture of the developmental tubes used in research. Although he has never removed all the air from a bulb, he can get all but one ten-billionth of it out. This is a sufficient vacuum for X-ray, radio-transmitting, and other high-voltage electron tubes.

Even when 99.99999999 per cent of the air is removed, there still remain more molecules in each cubic inch than there are people in the world. The population of the world is estimated at 2,000,000,000, but in a bulb evacuated to such a degree there are still about 40,000,000,000 molecules left in every cubic inch.—Ed.

THE END OF THE WORLD

Editor, Science Questions and Answers:

Astronomers and physicists have put forth many theories regarding the eventual end of the world. Can you tell me which probability is most likely, in your opinion?

L. I. D.,
Worcester. Mass.

First, in order to answer your question, it is necessary to know what you mean by "the end of the world." The termination of life and Earth's ability to support it, or the destruction of the planet itself? Either catastrophe would be the end of the world for all practical purposes.

The condition of our own planet is so dependent on the condition of the sun that we must consider it the controlling factor in our life story. The sun is a star, an average star, and there are millions of other stars—other suns. Some of our stellar neighbors show us the sun's past, others reveal its future.

No matter how massive old Sol is, some day it will change its last atom into energy and eight minutes later the earth will receive its last crumb and the cupboard will be bare. But that is billions of years in the future.

While we are waiting for this rather certain end, can anything else happen? Yes. Every so often a star is seen to blaze up suddenly. In a period of a few days, or even in a few hours this sudden out-pouring of energy may make a star hundreds of times brighter than it was before.

Such an outburst from our sun would sear our earth's crust to a cinder, turn the oceans into boiling cauldrons and leave no trace of higher life. If lower forms survived they might start again the slow climb of evolution to higher conscious life-forms that would not know of the previous struggle and its sudden end. It is conceivable then, that this might have already happened, and from the sterile earth we who consider its possibility may have slowly emerged. Even so we have no assurance that it will not happen here again.

Another astronomical conjecture as to the end of the world is the possibility of our sun colliding with another star. Our sun is now whirling through space at about twelve miles a second. The other stars are traveling also, some much faster, others more slowly. Picture it, millions of immense balls of fire aimlessly whizzing in all sorts of directions. As

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empty as space is, a near approach **can** take place—and does. Space is inconceivably empty of stars. Some one has likened it to five birds, one flying around over each continent. The birds represent stars and the entire atmosphere of the earth is space. What do you think the chances are of one bird flying near another? According to William H. Barton, Jr., Associate Curator of the Hayden Planetarium, this **can** happen. Our Solar System may have had its origin in such a collision knocking pieces off the sun, while the star that intruded the privacy of the sun went its way blithely. A near approach would cause tidal upheavals in the gaseous sun. The tips of the waves would clip off like spray in the surf to form worlds. And another near approach or collision could as easily undo the work of the previous one.

Meanwhile other accidents can happen to us. If something should slow down the earth's speed in its annual path around the sun, the tremendous pull of the sun's gravitation might draw us into the sun itself, or bring us so close that a fiery death would be our end. So far as we know *this* is not a likely fate for the earth. In our wanderings in space if we should encounter a resisting medium our orbital speed might suffer. A dense cloud of cosmic dust or gas—and there are such dark nebulae—could, if it were large enough, retard our progress and return us to the place from whence we came.—Editor.

STEREOSCOPIC MAPS

Editor, Science Questions and Answers:

I recently heard of a new stereoscopic device which is supposed to improve aerial photography multifold, particularly in regard to map-making. If you have any information available on this invention, I would like to hear about it.

K. E.
El Cajon, California.

A 25-square mile tract can be "picked up" from an airplane and set down on a table in three dimensions by means of an instrument known as a multiplex projector now being built by Bausch & Lomb Optical Co.

A plane working in conjunction with the aero-projector begins operations over an area containing three points accurately surveyed by traditional methods. As it flies out into unmapped territory, the shutter of an automatic camera looking down clicks at intervals.

The film is then developed and printed on small glass plates which are used as lantern slides in a battery of projectors mounted above a table. The images formed by adjacent projectors on the table overlap just as do the areas covered in successive photographs. Alternate projectors form their images in red and green light. The user wearing spectacles with one lens red and the other green, sees the overlapped area stereoscopically. He gets the same impression of depth as though he were a giant so huge that his eyes were set apart by the distance the plane flew between successive pictures.—Editor.

LONGEVITY

Editor, Science Questions and Answers:

While most biologists concede that heredity is the primary agent in determining how long an organism may live, don't you think that the axiom, "Hard work never killed anyone," is untrue? Does the spending of too much energy shorten one's life?

L. A.
Ontario, Canada.

In answer to your question, we can only point to the awful experiment made on white rats by the biologist, Slonaker. Slonaker put four of the little fellows near the beginning of their lives into a cage that kept revolving—always revolving like a squirrel cage. The cage had a mileage-recording odometer hooked up to it and these four unfortunate rats just had to spend their lives—running! These four perpetual marathoners had three lucky brothers living in another cage right beside them, eating the same food exactly, exposed to all the same conditions of life, precisely, except that they only made THEIR cage revolve when they themselves felt they needed a constitutional.

The four rats doomed to lifelong sprinting covered 5,447 miles and lived an average of twenty-nine months, point five. The three brothers who ran just when they wanted to lived on the average to the ripe rat old age of forty months, point three.—Editor.

SCIENTIBOOK REVIEW

LEGENDARY ISLANDS OF THE ATLANTIC. By William H. Babcock. American Geographical Society, 1922.

ALTHOUGH not new, this little volume is one that should be of interest to every science fiction fan, if only for its discussion of the Atlantis story.

Atlantis is probably the first mythical isle which was taken seriously, though even Plutarch seems to have had his doubts about it. Since then, there have been legendary isles by the hundreds on the world's maps.

As a matter of fact, one of them, Mayda, was still shown on a map published in Chicago in 1906, after having been batted about from one mythical location to another since Ptolemy's time.

Atlantis is dismissed by Mr. Babcock as a literary invention of Plato's. He examines most of the supposed evidence for its existence and finds it wanting. In the rest of the book he describes one by one the lost lands of history—St. Brendan's isles, Brazil, Mayda, Antillia, Estotiland, Drogio, Reylla, Buss, and others. Examining the history of each, and its appearance on ancient maps, he comes to the conclusion that mariners from the time of the Phoenicians had known far more about the Atlantic and the lands of the west than history tells us.

Phoenician coins were found in the Azores in 1749. Rune stones have borne out many of the Norse stories of the discovery of America.

Irish sailors, though not Saint Brendan, may have discovered the Gulf of St. Lawrence before 1325. In short, as writers of science fiction have often suggested, there were many more explorers who had visited America centuries before Columbus than we have any idea of. The Greeks had a temple to "the Unknown God."

We have our tomb of "the Unknown Soldier." Why not a monument to the "Unknown Discoverer?"—P.S.M.

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The Story Behind the Story

IT took the space-voyagers of Jules Verne's great novel, "From the Earth to the Moon," more than ten days to reach their destination—our satellite. Science fiction has come a long way since Verne's day. Modern readers—and the editors, too, have become a trifle impatient. Ten days? Why, that should be sufficient time for an atomic-powered spacecraft to negotiate a complete hop around the Solar System. It might even offer time for a cruise to a nearby galaxy—with the kind permission of the Messrs. Lorentz and Fitzgerald.

Maybe it's our streamlined Twentieth century that's giving modern science fiction writers their limitless speed. We don't know. But we can't help hoping, at times, for a swing back to the old-time, leisurely pace of the early interplanetary stories. The moon and the planets won't run away!

DRAMA ON THE MOON

VIA DEATH, by GORDON A. GILES, in this issue, winds up the series concerning the adventures of Mars Expedition Number One. This series has proved mighty popular with our readers, and we're pretty certain that one of the reasons for its wide popularity is the fact that the stories are realistic. Nothing in the stories is taken for granted. We wonder if Gordon A. Giles started as a disciple of Jules Verne. At any rate, here's what he has to say regarding his trio of space chronicles. He's brought his characters back to Earth—via typewriter!

This is the third and last of a series I had no idea would extend beyond the first story. In writing the first one (VIA ETHERLINE), it was my idea simply to show how hard-fought would be the conquest of space. It would not be a simple matter of perfecting rocket fuel and promptly inheriting the Solar System as a hinterland for Earth. There would have to be **first** expeditions. And those Columbuses are the men I wanted to write about—and did.

It occurred to me secondly that their activities on the new world would not be spectacular but common, everyday attempts to meet an alien environment halfway. They would not have to meet mental marvels and outwit them, but find water and a safe habitation. In short, it seemed to me timely to try a little realism, such as science fiction had more of in its younger days. Not that I condemn present-day science fiction—but I figured a plain, simple story might stand out among them. Strangely enough, it did, perhaps like the well-known sore thumb.

It rather astonished me to get a request for a sequel to the first story. But after this was completed, and my battered crew had still not reached Earth and safety, my solicitude for them could not be subdued until I had rescued them from the moon. So I wrote VIA DEATH without request, for my own satisfaction. I had to get those men—those that were left—back to Earth, whether the editor wanted them back or not. He did.

I think it was correct to assume that the rescue ship would have a hard time locating the marooned party on the unknown side of the moon. Imagine an airship lost in a continent three times as large as Asia, and completely unmapped. Would rescue ships locate its position immediately—I imagine not. Nor would they on the moon, all factors considered. So the search had to be drawn out agonizingly. And those men had to suffer for it. But to tell the truth, it hurt me more than it did them!

FUTURE FILMS

ANTHONY QUADE, chief technical photographer for Nine Planets Films, Inc., is in again. In this month's feature novelet, DOOM WORLD, he's back with more trick movie shots—more strange interplanetary creatures. And more feuding with the "Bring-'em-back alive" damsel, Gerry Carlyle.

But though the Carlyle-Quade feud seems to have been christened with a vat of sulphuric acid, the creators of both characters, Henry Kuttner and Arthur K. Barnes, are in reality the best of friends. The Winchell-Bernie team of science fiction, they both live on the West Coast, near Hollywood, and frequently get together for shop-talk sessions. And maybe they each brag about their characters. Here's the official low-down from HENRY KUTTNER:

So many factors enter into the writing of a yarn that it's often difficult to remember the exact circumstances of genesis. However, DOOM WORLD probably had its beginning when I wrote HOLLYWOOD ON THE MOON, to which it is a sequel. In the first story I touched briefly on the wireless-controlled robot creatures that would be used in future films, and a chat with Arthur K. Barnes clarified matters. Chief reason for the feud between Barnes' Catch-'em-Alive gal, Gerry Carlyle, and the represensible Von Zorn is the fact that the artificial robots of Nine Planets are too obviously mechanical, and that the public would rather see Gerry's monsters in the London Zoo. From that basis it was easy enough to find a way of curing the robots of their stiffness—by combining living brains with radio control. Once I had that much, the tale was well under way.

The science, I think, is not too far-fetched. The further atomic research progresses, the more there is left to find out about such phenomena as radioactivity; it isn't completely impossible that creatures impregnated with radium could exist. Certainly queer mutations would occur in such radioactive life-forms.

The monsters are drawn from natural and unnatural history. The "gliding lash" combines the attributes of an octopus, a flying squirrel, and the fabulous whip snake, which, according to Dr. Ditmars, is supposed to coil around a victim's body and whip its prey to death. The Juggernaut's method of reproduction isn't unique; there are earthly parallels, such as the Surinam toad I have mentioned in the yarn. Almost every attribute of the Plutonian devil is taken from life; some snakes use their scales as shovels to bury themselves; all, I think, shed their skins. The various toxins of the monsters will no doubt be familiar to the reader.

That's all, I guess—except that I hope the readers will like my yarn.

SPORE MIGRATION

NATURE'S best way of protecting organisms against all extreme conditions is through the medium of spores. And, as our author points out, even against the rigors of outer space. With this scientific

(Concluded on page 127)

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The SCIENCE FICTION LEAGUE

A department conducted for members of the international SCIENCE FICTION LEAGUE in the interest of science fiction and its promotion. We urge members to contribute any items of interest that they believe will be of value to the organization.

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WILLIS CONOVER, JR.

"MEN Against Death" is not only the title of an absorbing book by that famous popularizer of science, Paul de Kruif, but is the slogan of medical science. Death lurks in a thousand forms—often untimely. What hope is there that the microbe menace will be conquered?

The answer may be just around the corner. Alexis Carrel's chicken heart that has been kept alive for seventeen years—Steinach's glandular rejuvenations—Loeb's urchin-eggs that *eat* potassium cyanide and live—the many cases of hearts that have been made to beat again, by stimulants, after minutes of "death"—all these add up to something. But what?

The grim army of biologists is attacking this citadel of the foe, death. Already they have routed such enemies as typhoid, malaria, bubonic plague, that before our day decimated populations at a stroke. They have given new-born babies a thousand percent more chance to survive to the age of fifty-nine. They have given us anesthetics and life-saving surgery. They have unmasked the filterable viruses and other micro-menaces which bring death so suddenly.

NATURE'S ENIGMAS

But there is much, much to be done. What of cancer, and the White Plague, and heart-failure? How can they be conquered? What of the Life-expectancy of people past forty, which has only been increased by one-tenth of one percent in the last century? What of the Grim Reaper's heavy harvest among victims of pneumonia? Earnest men are slaving in laboratories to solve these enigmas.

Mankind's universal dream down through the ages has been for life eter-

MOST POPULAR STORY IN JUNE ISSUE

Here, in each issue, THRILLING WONDER STORIES announces the most popular story in the preceding issue. Novelet, short story, or short short—no matter what it is, your comments will decide.

June's favorite story, based on an analysis of all letters to the editor, was:

THE DUAL WORLD

A Gerry Carlyle Novelet by

ARTHUR K. BARNES

Second and third places, respectively, went to EDMOND HAMILTON for MURDER IN THE VOID and ROBERT MOORE WILLIAMS for THE MAN WHO LOOKED LIKE STEINMETZ.

Which do you consider the best science fiction story in this issue?

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nal or at least longevity beyond the normal. Science has marched many miles during the past few decades—but the goal of physical immortality seems to be a light-year away!

JOIN THE LEAGUE

Join the SCIENCE FICTION LEAGUE! It's a live-wire organization of science fiction's most ardent followers. Members get together for discussions of scientific nature, have scientific hobbies, and correspond with one another.

Just fill out the membership application provided on this page. There are active members and chapters in every part of the globe.

To obtain a FREE certificate of membership, tear off the name-strip of the cover of this magazine, so that the date and the title of the magazine show, and send it to SCIENCE FICTION LEAGUE, enclosing a self-addressed, stamped envelope.

An attractive membership card, suitable in size to fit your wallet, together with a list of the membership rules, will be sent to you.

CHAPTER NEWS AND GENERAL ACTIVITIES

Vancouver, British Columbia, Chapter

Erich Rogerson, of 1318 Burrard Street, Vancouver, B. C. would like to start a Chapter of the SCIENCE FICTION LEAGUE, together with friends of his in the vicinity. All readers of T.W.S. residing in the vicinity are urged to get in touch with Mr. Rogerson via mail.

LOS ANGELES

On December 16, '37, the Los Angeles Science Fiction League held its yearly election in conjunction with second annual Christmas meeting. After disposing of the necessary formality of reëlecting Russ Hodgkins to the Directorship, which post he has so efficiently handled since resignation of Director Hofford a year before, business was forgotten as the twenty-eight members and guests present settled down to the pleasure of enjoying the evening.

Early issues of major science-fiction magazines, fantasy fotos, bound fantasy excerpts, fan mags, books, and similar desirable collection items were distributed via the Xmas grab-bag, disguised with such mysterious titles as "Necronomicon," "Hints to Hacks," "World's Doom," etc.

Climaxed by a successful raffle of an unknown quantity, the meeting adjourned at a late hour.

To compensate for longer than usual period between meetings caused by a five Thursday month, a special get-together at the home of Roy A. Squires was attended by over a dozen members.

Early '38 brought revival of several fantasy films in and near L. A. Those seen recently by members include **The Invisible Man, The Phantom of the Opera,** original **Frankenstein,** etc., and, less than a dozen attending because of strangely appropriate extreme weather conditions, **The Deluge,** s-f epic from the book by S. Fowler Wright. Others are continually being brought back due to efforts of our "scientificinemadvisor" and other film-minded members.

Visitors, both localites and out-of-towners, have been frequent. At Dec. 16 meeting were Emil Petaja, famous fan and poet, and friend, Hans Bok, artist, who exhibited numerous excellent paintings of fantastic nature.

Others recently have been Maurice Duclos, author of recently published story, "Spawn of the Ray;" Fred Shroyer, recently from the east, who has since become a member and entertained us with numerous informal talks relating to fantasy and its collection, on which, judging by the astounding number of volumes he possesses, he is an authority; Al Cummins, writer recently become interested in s-f; Thomas R. Daniel, famous fan; mother of member Wil Stimson; and others.

Recently published and distributed among members were copies of the newly adopted Constitution and lists of contents of nearly-complete chapter library.

Also published and available to all fans, while supply lasts, is pamphletale, "The Television Detective," by David H. Keller, M. D., honorary member LASFL.

Meeting of 2/17/38

Unique was the second meeting in February for its high attendance for no special reason. The twenty-nine present equaled previous record set when Dr. Keller was guest speaker. Fred Shroyer spoke in general on the collecting of science-fiction and fantasy and in particular about some little-known books by George Allan England, celebrated author of "Dawn to Dusk." At Fred's suggestion, the chapter decided to inject more system into meetings in an attempt at increasing their value.

A series of talks by members in such subjects as the individual feels qualified to speak

(Continued on page 120)

APPLICATION FOR MEMBERSHIP

SCIENCE FICTION LEAGUE

Science Fiction League,
22 W. 48th St., New York, N. Y.

I wish to apply for membership in the SCIENCE FICTION LEAGUE. I pledge myself to abide by all rules and regulations.

Name .....
(Print Legibly)

Address .....

City .....

State ..... Age....

Occupation..... Hobby.....

I am enclosing a stamped, self-addressed envelope and the name-strip from the cover of this magazine (tear off name-strip so that the name THRILLING WONDER STORIES and the date can be seen). You will send me my membership certificate and a list of rules promptly.

6-38

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(Continued from page 119)

has been decided upon with several volunteers for near future offering such interesting subjects as bacteriology, perpetual motion machines, etc.

The more than twenty present at meeting of March 3 heard stories and experiences bordering on supernatural related by members and guests. Convincingly told by Charles H. Gurnett, "Stimmy's" mother, and Fred Shroyer were tales of the type commonly classified as "supernatural," something which Fred says doesn't exist.

Ably defending his point, he suggested that the occurrences we classify as such are in reality nothing more nor less than things which are not accounted for by our accepted scientific laws and which are as natural as anything recognized by science, and that rather than being scoffed at incredulously, "supernatural" happenings should be investigated by science in view of discovering new laws of nature or altering the ones we have to include these things thought to be outside the realm of reality. He cited as examples instances recorded in the works of Charles Fort, on which science has turned an unseeing back rather than giving them the serious attention they perhaps deserve.

Far from being an overimaginative person easily influenced, Fred strikes us as being clear-headed and calm-thinking, causing some of us to really wonder about the strange experiences he related.

Because of the unprecedented turn discussion took, Miss Fairchild's bacteriological lecture was postponed to the following meeting. At Fred's request, a special meeting on the fifth Thursday has been planned to be held at his home.

Imagination!, our chapter organ, is growing in quality with the addition of new features to replace the fiction which has been outlawed. The sixth consecutive monthly issue was distributed among members at this meeting and plans for forthcoming numbers were made. Non-members may receive a copy by sending ten cents to the secretary's address given below; a special offer of a free copy of "The Television Detective" with a six months' subscription at fifty cents is made.

All readers of imaginative literature in or near Los Angeles are urged to come to Brown Room of Clifton's cafeteria, 7th and Broadway, on the first and third Thursdays of each month; those not residing in the vicinity of an SFL chapter may keep in touch with the League activities through **Imagination!** Communications should be addressed to the secretary at 1745 Kenneth Road, Glendale, California. Telephonic communication may be had with FJAckerman in LA, FEDeral 2231, or RASquires in Glendale, Kenwood 5898.

QUEENS CHAPTER

Herbert E. Goudket, John B. Michel, Frederik Pohl and Donald A. Wollheim, who attended the March meeting of the Queens Chapter, expressed a desire to join and were unanimously elected to membership. They were provided with membership cards, stationery and copies of JEDDARA, the organ of the club. Pohl, who was director of the Greater New York Science Fiction League, resigned his post in favor of Elton V. Andrews in order to join the Queens Chapter.

The names of the members were written on slips of paper and placed in a hat to decide who was to have his "biography" written; Robert G. Thompson was the lucky fellow. Jack Gillespie, chosen by a spun penknife, will be the biographer. The article will appear in the next issue of JEDDARA.

Goudket spoke of his proposed science fiction fan magazine, which, in each issue, would incorporate a photo and short biography of a fan. This would enable out-of-towners to see what their metropolitan brethren look like.

Copies of the current issue of Richard Wilson, Jr.'s, SCIENCE FICTION NEWS LETTER were passed out.

During a twenty minute recess Goudket took motion pictures of the Chapter members. All attending were invited to his home the following week to see the finished films.

Director Taurasi announced that some magazines were left over from a previous club which could be used as a nucleus of the Queens Chapter library. Thompson volunteered to become librarian.

After the meeting closed amateur movies were shown, the subjects being Buck Rogers and Alice in Wonderland.

PHILADELPHIA CHAPTER

It has been quite some time since I last informed you of the activities of the Philadelphia Science Fiction League. However, you may rest assured that, despite the fact that no notices have been sent to you, the Philadelphia SFL continues to hold meetings every two weeks.

At the second annual reorganization meeting, held a few months ago, the following officers were elected; Robert A. Madle became the new Director; John V. Baltadonis was elected to a second term as Treasurer; and Milton A. Rothman, formerly the Director, became Secretary. However, he refused the position at the following meeting due to the fact that he discovered that he had to devote the majority of his time to college work. A new election was held and Oswald Train was elected Secretary.

We manage to have a good time at our meetings. Usually one of the members prepares a speech on some timely scientific or scientifictional subject. At a recent meeting group photographs were taken. We now publish a regular club magazine which is composed of material by members only. The publication is distributed gratis to all members in good standing. After the business portion of the meeting is over the members usually discuss the various phases of science fiction. From these discussions it has been revealed that THRILLING WONDER STORIES has increased considerably in popularity since its initial appearance. Incidentally, the entire membership is in favor of the new companion magazine. We all fervently hope to see it appear on the newsstands in the near future.

Speaking of membership; I am convinced that there are many science fiction fans residing in and around Philadelphia, who, for some reason, have not joined up with the gang. With the idea of securing more members for the Chapter, I wish to make the following announcement. Hereafter the Philadelphia Chapter will include Camden, New Jersey, in its scope. These two cities are just as conveniently connected as Manhattan is to Brooklyn. Therefore, I hope all science fiction fans residing in Camden will communicate with headquarters as soon as possible. All interested are invited to write to Robert A. Madle, Director, 333 E. Belgrade Street, Philadelphia, Pa.—Robert A. Madle.

THE SECOND CONVENTION OF THE SCIENCE FICTION ASSOCIATION

The Science Fiction Association held its second Convention in London, England, on Sunday the 10th of April last and is pleased to report that the event was an unparalleled success, from every point of view.

The total number of delegates to attend was forty-three, which is believed to be a world's record attendance for any such event. Amongst this assembly was included practically every one of the foremost personalities of British Science Fiction.

The afternoon session, which was attended by members only, took the form of an Annual General Meeting and the various officers of the Association were called upon to present reports of the year's progress.

A definite "Constitution" of the Association, based upon a proposal of the S. F. A. Council, was passed by the assembly, and this was followed by a ballot for the Association's President. The nominations for the Presidency were four in number—viz. Professor A. M. Low, John Russell Fearn, John Beynon Harris and Walter H. Gillings, and after an exceedingly keen and even ballot it was found that the extreme popularity of Professor Low had carried him through to the top of the poll, and he thus became the first President

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THE READER SPEAKS

(Continued from page 8)

like "Classics of the Past," or something along those lines.

No more for the present, except that I notice that Eando Binder has been missing for a while. Bring him back; he's your best author.

SCIENCE QUIZ OKAY

By Leslie McCarthe

Although the June issue of T.W.S. seems a little bit lacking in punch, I must congratulate you on at least two new ideas: 1—SCIENCE QUIZ, which is a breezy and interesting piece of sugar-coated education. 2—The Gerry Carlyle—9 Planets Films feud, which is the first time, I think, in the history of science fiction, that such a cross-reference between characters of two different authors has been tried. T.W.S. scoops 'em again, and more power to Messrs. Kuttner and Barnes.

About Gerry Carlyle—whom everybody seems to like—I believe I have solved the secret of her popularity. Barnes has done that rare thing in science fiction—created a real, human character. I think we will agree that most science fiction characters—the professor and his daughter and the bright young man, etc.,—are all either heroes or villains. Even Penton and Blake conjure up no live picture in a reader's mind; they are just stooges to carry Campbell's brilliant science.

Characters have been created before—Tubby used to be a human being; Williamson's Giles Habibula is another; ditto Hawk Carse and a few others. But I think Gerry Carlyle will stack up alongside any of them.

I shouldn't slight the rest of the issue, just because I am sold on Gerry and "The Dual World." The best of the shorts was "Wings Across the Cosmos," and Haggard takes the booby prize without a struggle. Hamilton's letter was even better than the story, which was passing fair. The idea behind "Terror in Utopia" was very slight, though well written.

Before you make a place for this in the wastebasket, let me vote for a companion magazine, too.—1901 W. 107 St., Los Angeles, Calif.

CORRECTION

By Jack Williamson

Correction, please, as Charlie Chan says. Re the Pleiades, SCIENTIFACTS, page 54, T.W.S. for December. I believe they are not a constellation, but a group in the constellation Taurus. The cluster contains more than eleven stars. I have counted fifty with my own small telescope. Photographic plates of the region show two thousand stars. From the spectral characteristics of the star Pleione, Professor Pickering formed the belief that it was formerly brilliant enough to have been the seventh visible world, the "lost Pleiad."—Elida, New Mex.

PICS, PLEASE

By J. J. Demaree

Unlike most of your correspondents, I do not care if you print this! I just want to be on record as all in favor of a companion mag to T.W.S., preferably a quarterly if T.W.S. can't go monthly.

A while back I made a suggestion which a few of the readers endorsed—a department giving photos and biographies of the authors. I see that there's not much room in the book for such a feature, but why not in the new mag? Well, all right, then!

As for authors, you could hardly beat your present batting order of Campbell, Binder, Barnes, Kuttner, Smith, Hamilton, et el., with maybe Merritt or Keller tossed in.

What are we waiting for?—Los Angeles, Calif.

(See photo and biog. of Frederic Arnold Kummer, Jr., in this issue.—Ed.)

WELCOME TO THE FAMILY

By Langley Searles

Was I surprised last summer when, out of curiosity, I bought a copy of T.W.S. at a newsstand and read its stories. I had given up all s-f publications, except one other magazine. I had purchased about one copy a year of T.W.S. just to see if perhaps it might be improving . . . and it was!

The October issue was just fine, "The Hothouse Planet" particularly, written in attractive Weinbaumish style. "Hollywood on the Moon" was the best story in the April issue. A bouquet to you, editor, for your good work. And I'm a regular T.W.S. fan now.—34 Amherst St., Milford, N. H.

EDDINGTON TOPS

By Abe Kirschbaum

I wish to compliment you upon the excellence of your magazine, THRILLING WONDER STORIES, and for the very good imaginative tales it contains.

Particularly, I wish to stress the unusual article by the author of "Eclipses of the Sun," Sir Arthur S. Eddington, in your April issue.

I am greatly interested in astronomy, particularly eclipses, and would like to know if Eddington wrote a book on that subject.—745 Vermont St., Brooklyn, N. Y.

(Two valuable books on Eclipses are: S. A. Mitchell's "Eclipses of the Sun," and Isabel M. Lewis's "Handbook of Solar Eclipses." The former published by Columbia U. Press, the latter by Duffield.

The science reading room of the New York Public Library should be able to help you with other books on this subject.—Ed.

FUTURE FUN

By John Albert Luck

I have read your fine magazine for some time and always enjoy spending an hour or

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so browsing between its pages. I just let myself go, and presto, I am in the future doing things that mankind will be doing when I am all but forgotten.

Reading T.W.S. is just another way of living a future life, and enjoying to the full those things that we half-doubt today.

I also read THE READER SPEAKS and get a kick out of some of the letters, especially when a reader wants an author to be explicit in all details concerning a war on Mars, etc.

I like to read stories as fiction, not as a bunch of compiled facts, and my sympathy goes out to the author who is called to task because of a slight error in compiling some mathematical problem.

I would like pen-pals from all over the world and will answer all letters promptly. —706 Grand Boulevard, Flint, Michigan.

A BOUQUET FOR QUADE

By Anton B. Raines

I am astounded, I am overwhelmed, I am completely devastated! I picked up the April, 1938 issue of T.W.S., immediately indulged my mental coordinatives in a conceptive formation of word-images in the region of the cerebrum, and what do I find! A super-issue, with super-stories. I never expected to find such humor combined with science as in Henry Kuttner's "Hollywood on the Moon," and "Easy Money," by Edmond Hamilton. Who'd ever thought of a story like "Hollywood on the Moon"? Let's have more of Tony Quade. That story calls for a sequel.

The "Infinite Enemy," by Jack Williamson, comes next on the list. That was a real powerful story on a super-cosmic scale. Give us some more stories by Jack Williamson if possible.

Smith really did not develop "The Dark Age" as he should have. He had a plot for a much longer story. "Rays of Blindness" was excellent.

Please don't pay attention to these fellows that are asking for serials. I don't want serials. That is one thing that has always kept T.W.S. apart from other science-fiction magazines. Keep it that way. And try to make your mag a monthly, will you?

I notice several comments on Eando Binder's "Life Eternal," in which Anton York continues his conquest. I knew when I read "Elixir of Life," that it should have a sequel. I have never yet read one of Binder's stories that didn't contain plenty of real science. He is one of my favorite authors. John Russell Fearn also rates tops with me and gives us good science.

Your magazine undoubtedly tops all other magazines. With its line-up of a great many stories, articles, departments, and features, it really offers the best in science-fiction. SCIENTIFACTS, IF, SCIENCE QUESTIONS AND ANSWERS, and all other features readily receive my commendation.

I simply believe that all other science fiction magazines (and I have read all kinds) can't even compare with T.W.S. in its diversity of fictional interests for those readers leaning toward the scientific side.

There is only one little thing that I can find wrong (in my opinion) with your magazine. It is not large enough. There is not enough space given over to long stories. Otherwise the magazine is all right. The illustrations are supreme. Schomberg and Marchioni can really draw machines.

Your cover for April was very good. This artist Brown can do his stuff.

Although this is the first letter I have ever written T.W.S., there is one thing that I have been wanting to suggest for a long time. Why not, in each issue, put in a full-page color painting depicting some scene of the future, such as a rocket-ship in space, two planets colliding, a meteor striking a ship in space, monsters on other planets, etc? Pictures to be framed. They would make a mighty interesting collection.

And now here's the sad part of science-fiction. When I approach a friend with a copy of T.W.S. and proceed to expound to him a few of the principles of cosmic concept, what do I receive! They laugh and say that it's all a lot of bunk, that it's impossible, couldn't happen. And disappointedly I slink away with the precious T.W.S. tucked under my arm and I go off by myself and shut myself in a creative sphere of imagination all my own and revel in the fact that I am not as stupid as some people. Alas for humanity! Woe for progress, for science!

That's enough of this splurging and sputtering. I can see this letter already consigned to that inexorable destination of all undesirable missives, the waste basket. Though I am only 16 years of age, you would be surprised at the length of time I have been reading T.W.S.. You would also be surprised to know how many young readers there are reading T.W.S.—R. F. D. 1, Brinkman, Oklahoma.

THESE AMAZING ANTS

By Montgomery Mulford

The ant, probably, has been the subject of more tales than any other insect. He has been the topic, too, of a number of what we might refer to as "fantastic tales"—the fantasy however, not very much, if at all, exaggerated. After reading John Russell Fearn's tale of the ants, "Lords of 9016," I am enthusiastic over some studies I had previously made of ants.

That the ants possibly will survive long after man has vanished, or nearly vanished, from the earth, is no far-fetched idea. Wherever "wilds" develop, particularly jungles, ants multiply by the billions. And they do cause untold havoc.

I recall from memory, as I write this, two authorities worth quoting. Carveth Wells the great explorer, and Count Byron de Prorok the archaeologist, are referred to.

First, as Wells tells it, about the ants of Malay. They are aggressive, stubborn, sempiternally active. When they come to a stream, they "hitch" on to one another,

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roll themselves into a sizeable ball, and roll, floating, across!

Secondly, as Prorok has told, the Yucatan—south Mexico, contains giant ants; so fearful that they have caused large villages to be deserted upon their foraging marches!

In Africa they are at places so numerous that they construct "skyscrapers"—mounds that are often taller than any native of the continent!

There are numerous fearful and fearsome insects in various parts of the world; New Guinea is pestered with several; Yucatan has a gold-fly that even causes blindness and makes people, when the creature is found, desert villages!

Some scientists have said that if birds were extinct, insects would make animate life on earth extinct within ten years.

We are not used to very large insects, usually; but in tropical lands they grow to immense sizes. Malay has them. The Yucatan ant grows to an inch in length!

Ants seem to escape being devoured as much as most of the others; ants multiply "faster than rabbits." So an ant-conquest of the world certainly is highly plausible.—914 Delaware Ave., Buffalo, N. Y.

A NEW READER

By Frederick G. Kempin, Jr.

I have only recently bought my first copy of T.W.S. It was recommended by a friend who claimed all sorts of things for it. He did not claim enough. In High School I found the study of Physics and Chemistry very intriguing. However, I never associated a magazine with accuracy, never suspected that so much scientific information could be divulged for fifteen cent.. Your articles are excellent—make them bigger. Get someone like Sir James Jeans to write every month, even if you have to raise the price of the book to do it. "IF" is excellent.

The only story I can criticize is "Dream Dust from Mars." The story is not s-f because it can be made over into a Twentieth Century Story. It is merely a story of the future—not scientifiction.—623 West Diamond Street, Phila., Pa.

WANTS SCIENCE ARTICLES

By Richard I. Meyer

The current issue excels them all to date. In my estimation the best story of the issue was "Lords of 9016," by John Russell Fearn. Next comes "The Infinite Enemy," and "Easy Money." I want you to know that I am heartily in favor of any companion magazine that you may publish; no matter whether it be a monthly, quarterly or what have you.

Your science article for this month was one of the finest I have yet had the pleasure to read, and I approve of your publishing one every issue. I am fifteen years old, and have been reading s-f for a number of years. I would be very much interested in hearing from some readers and I will promise to answer promptly the letter of anyone

(Continued on page 124)

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- ☐ **Traffic Management:** Training for position as Railroad, Truck or Industrial Traffic Manager, Rate Expert, Freight Solicitor, etc.
- ☐ **Law:** LL. B. Degree.
- ☐ **Modern Foremanship:** Training for positions in Shop Management, such as that of Superintendent, General Foreman, Foreman, Sub-Foreman, etc.
- ☐ **Industrial Management:** Training for Works Management, Production Control, Industrial Engineering, etc.
- ☐ **Modern Business Correspondence:** Training for Sales or Collection Correspondent, Sales Promotion Manager, Mail Sales Manager, Secretary, etc.
- ☐ **Stenography:** Training in the new superior machine shorthand, Stenotypy.
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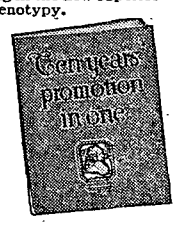
- ☐ **Office Management**
- ☐ **Stenotypy**



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Best Mystery and Crime Stories in Our Companion Magazine

THRILLING DETECTIVE

10c AT ALL STANDS 10c

(Continued from page 123)

who writes.—3156 Cambridge Avenue, Chicago, Illinois.

BARNES BEST

By Jack Frazier, Jr.

I have been reading your magazine for eight months and I feel that the time has come for me to have my say. I am a schoolboy 15 years of age. I have lived in the Hawaiian Islands for thirteen years and I can safely say that your magazine is very popular over there. I have read your magazine when it was in the old form, before you took it over. Then it was pretty bad. Your magazine has improved 100% and it is still improving. I say now that your magazine is the best s-f magazine on the market.

I can vaguely remember those nightmares in technicolor painted by Frank R. Paul. Now your covers are swell. Not too much color and not too unbelievable. The October cover was the best. By the way, I pick Arthur K. Barnes' "The Hothouse Planet" as the best story of the year. Penton and Blake also had some very good science fiction adventures.

Well, that's about all. I have just read your February issue. That is all except "We, the Invisible." I have not gone that far. The best so far is "Via Astroid." I am hoping for your new magazine to come out real soon.—Camp Normoyle, San Antonio, Texas.

LEY LIKED

By Frank Kroha, Jr.

Allow me to offer my felicitations, congratulations, etc. on the Dec. 1937, issue of T.W.S. There was only one thing wrong with it. There was no story by Eando Binder. And what good is an issue of T.W.S. without the inimitable Binder touch? However, I'll let you get away with it as you redeemed yourself by taking out ZARNAK. What a relief! I thought it would go on forever. "Eight Days in the Story of Rocketry," by Willy Ley, was about the best article you ever printed. I doubt if the article by Sir James Jeanes will top it. However, more life to T.W.S. and Eando Binder and everlasting rest to ZARNAK.—415 Evergreen Avenue, Brooklyn, N. Y.

THE CREAM OF THE CROP

By Karl Klondike

Just got the February issue of T.W.S. Cover is the best so far. Contents as far as I have read are better than the average. Inside illustrations are good. Typical of Wesso and Marchioni. In the matter of the quarterly, I think that it would be a good idea.

The best stories you have printed so far are: "The Circle of Zero," "Liquid Life," "The Lanson Screen," "Protoplasmic Station," "The Astounding Exodus," "Menace from Microcosm," "Conquest of Life," "The Hot-house Planet" and "Dream Dust from Mars."

Say, I really like articles by the Greats like Jeans and Eddington. You are getting

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up when you get these writers. And I'm really thrilled by the fact that you are bringing back my old favorite, Clark Ashton Smith. As to the size of the quarterly, why, the size of the present T.W.S. would be all right with a bunch of pages added. And, as for the authors, I think you have the cream of the crop.—1219 W. Largent St., Harrisburg, Illinois.

ANALYSIS

By James Whiting Saunders

I have just purchased the Feb. issue of your magazine and have read editorial announcement of the possibility of a companion magazine. I shall certainly support your new publication, whether it be monthly, quarterly, or what.

As to the type of material, I should like to see only well-written, well-handled stories. This, first of all. Apparently, many authors of scientific stories are of the opinion that a fictionized essay constitutes a story. Many a splendid idea is often wasted upon undernourished short stories, and stultified novels. By all means give us well-rounded stories. If your policy is against serials, then by all means give us novels in the companion mag.

And now as to size: I suppose both you and the publishers have become immune to all arguments. Some people say that the small size is easier to hold and easier to store. That is true. It does not alter the fact, however, that the large size mag. is "classier." Some readers would undoubtedly say that this is snobbishness. I would answer them by saying that the larger size is more appealing esthetically; the print is larger; the whole layout is more generous; and the ilustrations are more boldly reproduced.

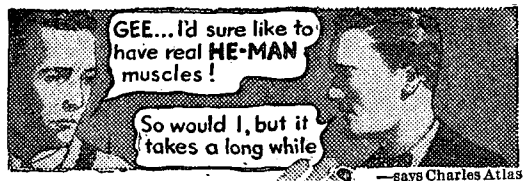
As for departments, why not simply duplicate the ones in T.W.S.? You might add a science discussion department, if too many readers did not find it dull. Also, and this you will probably consider an entirely foolish idea—and perhaps not feasible—why not bring out a series of reprints of the better science stories—"The Moon Pool," "The Blind Spot," etc.?

Naturally, the question of illustrations comes up. Both for the bi-monthly and the proposed companion book. I want to set myself down on the side of better taste. Can we not have less luridness?

A certain reader in the Feb. issue complains that it does not matter whether or not the cover illustration is good or bad—to an intelligent reader.

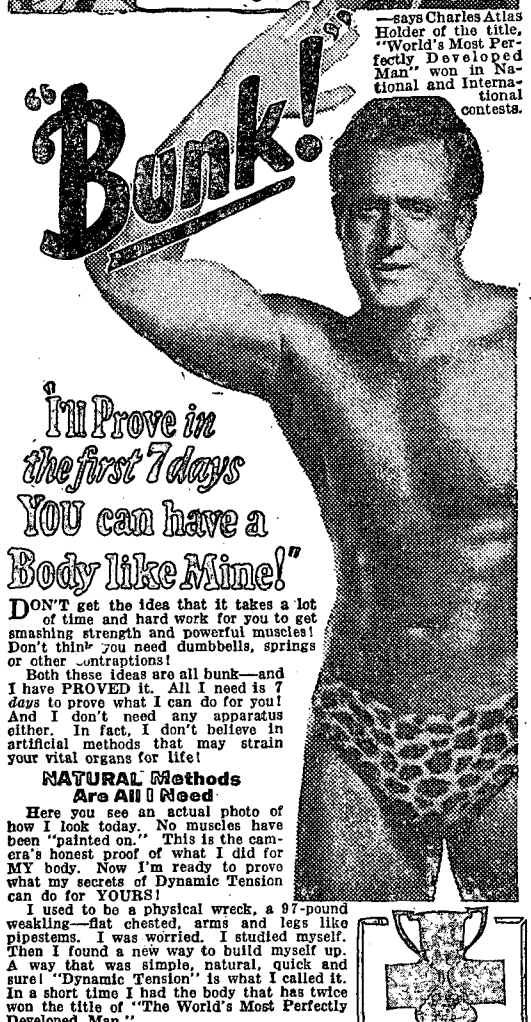
I disagree! I should think that most T.W.S. readers do not feel like Pasteur or Darwin, in that in reading a science mag that they have discovered something beyond compare. To most of us readers, I believe it is still a magazine—no matter how fine. A scientist might argue that an illustration was crude, but since it represented ultimate reality, it might be excused, and accepted, so far as the case in hand was concerned. But I can see no reason why a reader should be so bound! After all, this is a magazine devoted

(Concluded on page 126)



—says Charles Atlas Holder of the title, "World's Most Perfectly Developed Man" won in National and International contests.

"Bunk!



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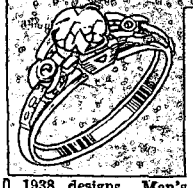

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(Concluded from page 125)

for the most part to fiction. And since it is a magazine of stories I believe the illustrations to be of great importance—even to an intelligent person.

If I may suggest a group of artists for both T.W.S. and the companion magazine—here they are. Wesso, Dold, Brown and Binder. If you really mean to have another mag—though I think a monthly would be infinitely better—I'll buy you!

As postscript, use these authors: Keller, Breuer, E. E. Smith, R. M. Williams, Campbell, Ernst, Binder, Ayre, Coblentz, Don A. Stuart, Hamilton, Long, Farley, Kline, Merritt, Barnes, Burks, Haggard, etc.—104 Cedar St. Rosemont, Alexandria, Va.

SCIENTIFACTS

(Concluded from page 105)

THIS INCREDIBLE EARTH

THE deepest hole in the ocean, Emden Deep near the Philippines, is very little closer to the earth's core than is the top of Mt. McKinley in Alaska. This seeming paradox is due to the fact that the earth is not a true sphere but bulges somewhat at the equator and is flattened at the poles . . . .

Rattlesnake poison and many other snake poisons may be eaten with safety! This is due to the fact that these poisons are broken up by the digestive fluids of the stomach and become harmless, nutritive substances. On the other hand, ordinary white of egg is a poison if injected directly into the veins, because it is similar in chemical nature to rattlesnake venom . . . .

Only three people out of a 100,000 ever reach the age of one hundred . . . . The expectation of life has risen in a single generation or so about a dozen years. It is now about sixty-one for all babies, black and white . . . . If the hair on your head did not fall out, it would grow to a length of about 40 feet in 72 years . . . . If the earth suddenly stopped moving in its orbit, it would fall into the sun within two months . . . . White paint can be made whiter by adding a few drops of black paint . . . . Although the length of the day varies with the latitude and season, every place on earth receives the same number of hours of daylight in the course of a year . . . .

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THE STORY BEHIND THE STORY

(Concluded from page 117)

fact for a premise, it provided enough stimulis for PAUL CHADWICK, popular author of detective stories, to start the ball rolling on his first science fiction short, THE SATANIC CYSTS. Get an earful as to the genesis of his tale:

Thought association is a funny thing. A door weight and an old scientific question lie behind my story, THE SATANIC CYSTS. The door weight was a two-pound meteorite found in a hayfield by a farmer neighbor who put the thing to a practical use. The ancient question was—how did life first start on this earth?

While I was studying science I used to hunt for the answer to that question as briskly as a yellow dog hunts fleas. I listened to what the mechanistic biologists had to say, and I listened to the vitalists with their theory of a teleological principle separating animate from inanimate matter. But it was an astronomer, Harlow Shapley of the Harvard Observatory, who introduced me to the answer I liked best during a course of lectures in Lowel Institute, Boston. That is the theory that living germs may possibly drift from planet to planet through interstellar space.

How could this happen? Well, there are biologists now who say that the earth itself may have left germ-laden dust behind it in its dizzy waltz through space. When the island of Krakatao out near Java blew up in 1883 in one of the greatest volcanic eruptions in history dust was thrown to the farthest edges of the earth's atmosphere and probably beyond.

It's likely that some of that dust slipped into space and will some day drift into the atmosphere of some other planet. And, when you stop to consider that encysted bacilli, alive and cheerful, have been found in some of the oldest Egyptian mummies going, you'll see why the Dust Theory of evolutionary genesis seems reasonable.

It was Lucretius way back in the First Century, B.C., who started the idea of life-bearing particles drifting between the stars. And many biologists today think that wise old Greek was on the right track. But it took this theory, plus the meteorite found by the farmer, to start the plot germ of THE SATANIC CYSTS incubating in my brain. My typewriter was the factor that the chemists would call a "catalytic agent."

INTERSTELLAR RAIDERS

THE EXTERMINATORS, by FREDERIC ARNOLD KUMMER, Jr., is an exciting story of interstellar warfare. It wasn't a newspaper clipping or some scientist's lecture that inspired his tale, but a slight case of elbow-bending. Here's how:

I was in my laboratory (the neighborhood tavern) one day talking to a friend of mine who had broken his test-tube-lifting arm, thus seriously hampering his scientific pursuits. Bemoaning his luck, he expressed the wish that he might be equipped with rubber bones that would bend and not break. We were laughing over the possibilities of such an occurence when it occurred to me that there was the basis of a story in it.

The picture of a person who had been, well, filet-ed, seemed rather spectacular. If continual exposure to X-rays can make one's fingers drop off (as in the case of Baltimore's Dr. Baetjer) why not a ray that would break down bone structure? It seemed plausible enough. Hence THE EXTERMINATORS.

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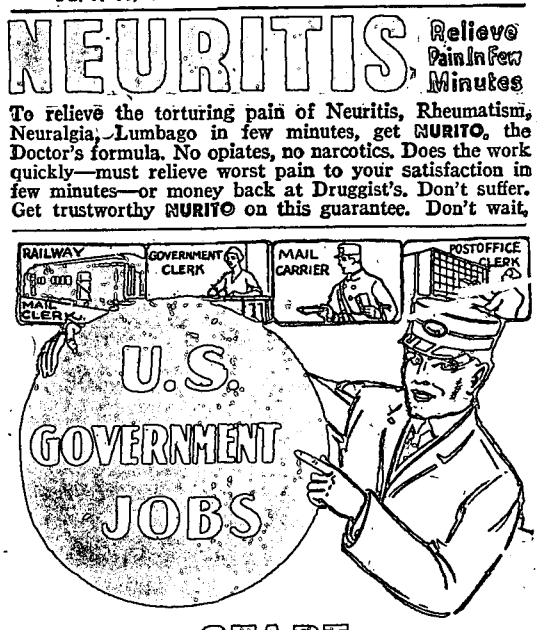
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SCIENCE FICTION LEAGUE

(Continued from page 120)

of the Science Fiction Association.

After sundry less important items of business had been discussed, the afternoon session concluded at 5:15 P. M.

For the evening session, many distinguished visitors had been invited, all of whom eventually attended, and these famous people included, besides the four nominations for the Presidency, all of whom were present, Benson Herbert M. Sc., I. O. Evans, Leslie J. Johnson, William F. Temple, Arthur Janser, Maurice K. Hanson, George A. Final, Len. Kippin, Douglas W. F. Mayer, H. S. W. Chibbett and Harry E. Turner.

When the evening session opened, the Chairman read the many messages from our friends overseas. These included greetings from THRILLING WONDER STORIES, AMAZING STORIES, the Los Angeles S. F. A. Branch (a cable), John Victor Peterson, Oliver Saari, Dr.-Ing. Otto Steinitz of Berlin, John D. Clarke, Ph.D., as well as a large number from friends at home.

After the opening address, the first of the evening's speakers rose to address the assembly. This was Leslie J. Johnson, co-author of "Seeker of Tomorrow," and in a topical and interesting discourse he had named "Search for Tomorrow," Mr. Johnson painted a thoughtful picture of Man's everlasting search for something better in life.

The next speaker, none other than the new President, Prof. A. M. Low in a clever and witty speech gave his views on the real value of science fiction. He made an example, that it did good in painting the horrors of future warfare, but also expressed an interesting side-light that war is often quite a valuable stimulant to human progress, in that it drives Man to the maximum of his powers. A great ovation greeted the President at the conclusion of his speech.

So great are the oratorial powers of Prof. Low, that it is indeed a tribute to the next speaker, Benson Herbert, to say that he held the assembly in a tight grip with his thought-provoking talk of Man's dawning sense of the Future, which, in Mr. Herbert's opinion, was a great step forward in evolution.

The following speaker, I. O. Evans, traced the evolution of Imaginative Literature from the earliest interplanetary fantasies of Lucian to the works of the master, H. G. Wells. His great point of stress was the introduction of sociology into science-fiction, an element which he thought had been much neglected.

When John Russell Fearn rose to address the assembly, he gave us a delightfully frank speech, in which he defied his critics to explain why it was that his stories sold, if he was as poor a writer as some of them would have it. He declared that he was doing his best and beyond that no man could be expected to do more. He also mentioned that his stories under pseudonyms were going over really big, which proved that it was the name and not the story that was always slanged.

The next speaker, Walter Gillings, told of his struggle to put a science-fiction magazine of British production upon the book-stalls, which had at last met with success, in the shape of the new quarterly publication, "Tales of Wonder."

The final speaker, Douglas W. F. Mayer, expressed the view that science-fiction for science-fiction's sake alone was a wasted and useless idea, and he proposed that science-fictionists should devote themselves to bringing about world enlightenment by featuring the sociological side of the future, rather than by its wars and material thrills. His speech was an intelligent interpretation of a movement of increasing strength in science-fiction, today.

The concluding item on the agenda, was the official changeover of the Association's Headquarters from Leeds to London, and with

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this accomplished, the Convention concluded.

Afterwards, however, the delegates were entertained by the London Branch members, to a Social Supper, which was every bit as successful as the Convention itself, and was undoubtedly the crowning success of a day which was undeniably the most momentous in the annals of the Science Fiction Association.

The Convention Chairman was Ken. G. Chapman, and the Master of the Ceremonies, E. J. ("Ted") Carnell.

NEW MEMBERS

United States

Bill Romain, Detroit, Mich.; Ted Finch, Des Moines, Iowa; Irving A. Goodman, Brooklyn, N. Y.; Jack O. Smith Correctionville, Iowa; Mortimer Cohen, New York City; Connell R. Miller, Dallas, Texas; Walter F. Kissel, Ellsworth, Wisc.; Joe Elkins, Waxahachie, Texas; J. J. Harrmann Grand Forks, N. Dak.; Donald Mason, Renovo, Penna.; Warner W. Mattern, San Francisco, Calif.; Laurence Ober, Jr., New York City; Morris Wolf, Bronx, N. Y.; William Windus, Duluth, Minn.; Ralph Leindorf, Bronx, N. Y.; Dan E. Boyle, Lemon Cove, Calif.; Lester W. Smith, Portland, Calif.; Earnest Leo Kish, Barberton, Ohio; Robert Wharton, Verona, N. J.; Dale Boden, Moline, Ill.; Martin Brokins, Kansas City, Missouri; Harold Green, Huron, So. Dak.; Donald Thielke, Milwaukee, Wisc.; Dale Tarr, Crawfordsville, Ind.; Dewey Surratt, Bowling Green, Kentucky; Harold Levy, Brooklyn, N. Y.; Albert Roger, New York City; Richard J. Burns, Brooklyn, N. Y.; Wm. McGuire, New York City; Dick Newton, Syracuse, N. Y.

Donald Everitts, Venice, Calif.; Joe Jaglowski, Bayonne, N. J.; Richard Tooker, Phoenix, Arizona; Litterio Farsaci, Rochester, N. Y.; Billie Baier, Chicago, Ill.; Billy G. Johnson, Elkhart, Ind.; Charles L. Shryack, Chicago, Ill.; Robert H. Coyle, Denver, Colo.; Celeste De Pinto, Los Angeles, Calif.; Joseph Gilbert, Batesburg, S. Car.; Jerome R. Salveson, Thief River Falls, Minn.; Donald F. Catz, New York City; Wilbur Widmer, West New York, N. J.; Lawrence E. Holloway, Glenwood Springs, Colo.; Irving Reich, Ann Arbor, Mich.; Julius Nelson, Windber, Penna.; Leonard Vogel, Brooklyn, N. Y.; Robert Leo Black, Austin, Texas; Arthur D. Lewis, Jr., Cambridge, Mass.; Jack Beckwith, Lansing, Mich.; Jack Levinson, Bronx, N. Y.; E. A. March, Ft. Wayne, Ind.; Jack McCarthy, New Britain, Conn.; Stephen Marshall, Chicago, Ill.; William J. Provenzale, Whitehall, Mont.; Henderson F. Sigler, Harrisburg, Penna.; Alfred Grossman, Philadelphia, Penna.; Frederick W. Hallock, Rockford, Ill.

Foreign

Ernie Dandurand, Montreal, Canada; Vic Jonasson, St. James, Manitoba, Canada; John Simpson, Buckingham, Prov. Quebec, Canada; S. Southwell, Essex, England; George Graham, Glasgow, Scotland; Henry Zacharias, Chilliwack, Prov. British Columbia; Stanley J. Hallett, Wolverhampton, Staffs, England; Rodney Smith, Essex, England; Ernest J. Morris, Auckland, New Zealand; Kenneth G. Chapman, London, England; David H. Black, London, England; George A. Final, Chesham, England.

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29x4.75-20	2.50	1.25
29x5.00-19	2.85	1.25
30x5.00-20	2.85	1.25
5.25-17	2.90	1.35
28x5.25-18	2.90	1.35
29x5.25-19	2.95	1.35
30x5.25-20	2.95	1.35
31x5.25-21	3.25	1.35
5.50-17	3.35	1.40
28x5.50-18	3.35	1.40
29x5.50-19	3.35	1.45
6.00-17	3.40	1.40
30x6.00-18	3.40	1.40
31x6.00-19	3.40	1.45
32x6.00-20	3.45	1.55
33x6.00-21	3.65	1.55
32x6.50-20	3.75	1.75
6.00-16	3.75	1.45

REGULAR CORD TIRES

Size	Tires	Tubes
30x3½	$2.35	$0.95
31x4	2.95	1.25
32x4	2.95	1.25
33x4	2.95	1.25
34x4	3.25	1.35
32x4½	3.35	1.45

HEAVY DUTY TRUCK TIRES (High Pressure)

Size	Tires	Tubes
30x5	$4.25	$1.95
32x5	3.95	1.75
34x5	4.25	2.25
32x6	7.95	2.95
36x6	9.95	4.45

Size	Tires	Tubes
33x4½	$3.45	$1.45
34x4½	3.45	1.45
30x5	3.65	1.65
33x5	3.75	1.75
35x5	3.95	1.75

Size	Tires	Tubes
34x7	$10.95	$4.65
38x7	10.95	4.65
36x8	11.45	4.95
40x8	13.25	4.95

TRUCK BALLOON TIRES

Size	Tires	Tubes
6.00-20	$3.75	$1.65
6.50-20	4.45	1.95
7.00-20	5.95	2.95
ALL OTHER SIZES		

Size	Tires	Tubes
7.50-20	$6.95	$3.75
8.25-20	8.95	4.95
9.00-20	10.95	5.65
9.75-20	13.95	6.45

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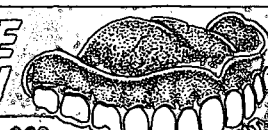

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- ☐ Welding, Electric and Gas
- ☐ Reading Shop Blueprints
- ☐ Heat Treatment of Metals
- ☐ Sheet Metal Worker
- ☐ Boilermaker
- ☐ Telegraph Engineer
- ☐ Telephone Work ☐ Radio
- ☐ Mechanical Engineering
- ☐ Mechanical Draftsman
- ☐ Machinist ☐ Toolmaker
- ☐ Patternmaker
- ☐ Diesel Engines
- ☐ Aviation Engines
- ☐ Automobile Mechanic
- ☐ Commercial Refrigeration
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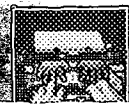

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